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A CRITICAL REVISION OF THE GENUS EUCALYPTUS

BY

J. H. MAIDEN, I.S.O., F.R.S., F.L.S.

(Government Botanist of New South Wales and Director of the Botanic Gardens, Sydney).

Vol. VI. Part 1.

Part LI of the complete work.

(WITH FOUR PLATES.)

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> *"Ages are spent in collecting materials, ages more in separating and combining them. Even when a system has been formed, there is still something to add, to alter, or to reject. Every generation enjoys the use of a vast hoard bequeathed to it by antiquity, and transmits that hoard, augmented by fresh acquisitions, to future ages. In these pursuits, therefore, the first speculators lie under great disadvantages, and even when they fail, are entitled to praise."*
>
> MACAULAY'S "ESSAY ON MILTON."

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DESCRIPTION.

CCLXXXVII. E. Sheathiana Maiden.

In *Journ. Roy. Soc. N.S.W.*, xlix, 312 (1915).

Following is the original description:—

Arbuscula gracilis nunc 10 feet alta, erecta, cortice longis tenuibus lamellis secedente. Ramulis glaucis, plerumque subteretibus sed ultimus ramulis angulatiusculis. Foliis maturis obscuro-viridibus, rigidissimis petiolatis (petiolis 1–1·5 cm.) lanceolatis, paullo falcatis usque ad 8 cm. longis et 2 vel 3 cm. altis. Venis lateralibus patentibus. Venis haud prominentibus. Foliis valde oleosis. Floribus plurimis. Umbellis usque ad 7 capitulo, pedunculis 1 cm. pedicellis dimidio aequilongis. Operculo fere hemisphærico, umbonato, plus dimido cupula aequilongo. Cupula conoidea plerumque 2-angulata. Antheris amplis, paralleliter aperientibus, glandula dorsum fere adhaerente. Fructibus subcylindroideis, maturis non visis.

A specimine culta solum nota.

A slender young tree, 10 feet or more high, at the present time, erect in habit, the bark falling off in long thin flakes (ribbons).

Glaucous, branchlets generally round, though ultimate branchlets somewhat angular.

Juvenile leaves.—Not available.

Mature leaves.—Dull green, of the same colour on both sides, rather rigid, petiolate (petioles 1–1·5 cm.), lanceolate, only slightly falcate, up to 8 cm. long and 2 or 3 cm. broad. Lateral veins spreading, roughly parallel, disposed at an acute angle to the midrib. Venation not very prominent, the leaves covered with oil-dots, and evidently rich in oil.

Flowers.—Very floriferous, umbels leaf-opposed to the last leaf, the umbels up to seven in the head, with peduncles of 1 cm. and pedicels of half that length. The operculum pointed when half ripe, but when ripe nearly hemispherical and with an umbo, rather longer than half the length of the calyx tube, which is conoid, has (usually) two angles, and tapers into the distinct pedicel.

Filaments pale yellow or cream-coloured, which dry orange-red and exhibit a pretty contrast with the cream-coloured anthers. Anthers large, creamy-white, opening in parallel slits, the gland nearly filling up the back, and the filament attached almost at the base.

Fruits.—Subcylindroid, but not seen ripe. Thin, defined rim. The tips of the valves, now represented by a persistent style and unexpended stigma, will, when ripe, probably become awl-like and will protrude beyond the orifice, in this respect becoming reminiscent of *E. oleosa.*

I name this plant in memory of Mr. Sheath, a first-class horticulturist, who was keen on the cultivation of native plants.

In April, 1917, I received spontaneously grown specimens from Dr. F. Stoward, who described it as "A Mallee, 15–20 feet high and 1 foot or more at some distance from the ground. Bark rough on old trees, smooth on saplings."

RANGE.

Known only from a cultivated specimen in the King's Park, Perth, Western Australia. (The late Mr. J. Sheath, Superintendent up to 1913.) Mr. Sheath informed me that he received the seed from "the Eastern Gold-fields, near the South Australian border" (of Western Australia). He further informed me that it had been sent to him as *E. erythronema*. I have received additional specimens from the same plant from Mr. Sidney William Jackson, of Sydney, and from Dr. F. Stoward, Government Botanist of Western Australia, whose attention I had invited to the plant. (Original description.)

In April, 1917, I received flowering twigs, still without juvenile foliage and perfectly ripe fruit, from the Kunonoppin district, "grows on various classes of soil" (Dr. F. Stoward, No. 145). Kunonoppin is a railway station 174 miles from Perth in an easterly direction, on the Northam-Merredin railway line, and this will give a clue to the locality of the species. I trust that our Western Australian friends will soon be able to secure adequate material.

AFFINITIES.

This species belongs to the *Macrantheræ*, of which there are many members, and, in the absence of ripe fruits, I hesitate to indicate any close affinities. I am very anxious to get seeds.

DESCRIPTION.

CCLXXXVIII. E. striaticalyx W. V. Fitzgerald.

In *Journn. W.A. Nat. Hist. Soc.*, i, 20 (May, 1904).

Following is the original description :—

Arborescent, attaining a height of 40–50 feet or more with a stem diameter of $1\frac{1}{2}$ feet; bark dark grey, moderately thick, rough, persistent on the lower portion of the trunk, upwards thin and decorticating in small sheets, that on the cylindrical branches and branchlets whitish and smooth. Leaves alternate, conspicuously petiolate, ovate-lanceolate to lanceolate, straight or falcate, shortly acuminate, thick, almost coriaceous, 3–6 inches long, veins numerous, very fine, divergent, circumferential one close to the edge, dull-greyish on both sides. Peduncles axillary or lateral, solitary, or forming short terminal panicles through leaf-suppression, terete or hardly angular, erect or spreading, $\frac{1}{2}$–$\frac{3}{4}$ inch long, each bearing an umbel 6–8 moderate-sized flowers. Calyx-tube turbinate, in bud above 3 lines long, smooth or scarcely striate, tapering into a short pedicel, lid hemispherical, terminating in a straight obtuse beak, broader than and as long as or longer than the tube, with 10–15 longitudinal raised lines; stamens pale-coloured, inflected in the bud; anthers broadly oblong, with parallel distinct cells. Ovary shortly conical in the centre. Fruit obovoid, about 5 lines long, 3–$3\frac{1}{2}$ lines across, faintly and irregularly striate, slightly or not at all contracted at the summit, border thin, concave; valves usually 4, subulate, the points included. Seeds brown, irregular, without appendages, fertile ones 1 line long, $\frac{3}{4}$ line broad, sterile, about as long as broad.

In the same Journal, iii (January, 1911), I wrote :—

I found this species at Milly's Soak, near Cue, one of the type localities, and following are the notes taken by me on the spot :

E. striaticalyx is far less numerous than *E. microtheca*, and is on the edge of the *microtheca* belt. Called " York Gum " by local people, but they are free-and-easy with their names for trees. It was plentiful on a donga. Stumps are now seen 12-18 inches in diameter between Milly's Soak and Jack's Well, and it was formerly extensively cut for firewood, but the neighbourhood of Milly was made a recreation reserve and the remaining trees were saved.

Tree of 30-40 feet. Bark dark grey or blackish, flaky, thin, yellow inside, covering the whole of the trunk and part of the branches.

Timber very hard, pinky pale brown or pale brown when fresh. Rather erect in habit. Would be called a Black Box in Eastern Australia. Neither Mr. Fitzgerald nor I found flowers, but I collected timber and juvenile leaves, which he did not.

RANGE.

Milly's Soak, and about 4 miles east of Nannine, September, 1903 (W. V. Fitzgerald). The localities are in the Murchison district of Western Australia.

So far as observed, the new plant is confined to calcareous areas, with a permanent supply of fresh water at shallow depths. It appears to reproduce readily from seeds, suckers freely, and is apparently a moderately fast grower. Roughly, it covers an area of 5 square miles at Milly's Soak, and about 4 square miles east of Nannine. Both areas have in years past been largely drawn on for use in the various mines, and for fuel, and are now practically denuded of all matured examples. In the first-named locality the species is associated with *E. microtheca* F.v.M., in places being almost superseded by that species. Near Nannine the accompanying congener consists of irregularly grown examples of *E. rostrata* Schlecht. The presence of these Eucalypts offers a pleasing variation to the monotony of the greyish-foliaged "Mulga" (Acaciæ), which cover a vast proportion of these districts. It may be remarked that the so-called "White Gum" at Milly's Soak is the *E. microtheca* F.v.M., and the "Flooded Gum" east of Nannine is *E. rostrata* Schlecht, partly. (Original description.)

AFFINITIES.

1. With *E. foecunda* Schauer.

The new species constitutes one of the "Flooded Gums," or the "York Gum" of the Cue and Nannine mining districts. In cortical characters, the crooked nature of the trunk and in the wood is not very different from that of the true "York Gum" (*E. fœcunda* Schauer, var. *loxopheba*), but the foliage, flowers, and fruit are very different. (Original description.)

2. With *E. incrassata* Labill.

In the latter characteristics (flowers and fruit) it more closely approximates *E. incrassata* Labill., and differs chiefly from that species in habit, bark, and in the calyx lid being broader than the tube and conspicuously ribbed. (Original description.)

In the same Journal, iii (January, 1911), I wrote :—

> In my opinion this is a variety of *E. incrassata*. The juvenile leaves are as nearly as possible the same as those of var. *dumosa* collected by me at Dongarra. The Dongarra trees are large, so are those of the same species at Kangaroo Island, South Australia. The Milly's Soak trees are exceptionally large for *E. incrassata*, so are those of the two localities I have quoted. The timbers of the two species appear to be similar.
>
> The fruits are those of *E. incrassata*, while the ribs of the opercula are characteristic of those of *E. incrassata*.
>
> I shall be glad if any correspondent can favour me with flowers, but at present I see no grounds for separating it from the protean and widely-diffused *E. incrassata* Labill.

3. With *E. dumosa* A. Cunn.

In the last paragraph, under *E. incrassata*, I really referred to *E. dumosa*, for many years, by Bentham and others, included in *E. incrassata*. The two species are very close (see Part IV, p. 97, Plate 16, and Part XXXVIII, p. 223), and some botanists may be unwilling to separate them. The buds and fruits of *E. striaticalyx* are larger, and the pedicels more distinct, but I cannot find that the leaves and floral organs are specifically different from those of *E. dumosa*. I give it the benefit of the doubt at present, because of its geographical distribution.

DESCRIPTION.

CCLXXXIX. E. taeniola Baker and Smith.

In *Papers and Proc. Roy. Soc., Tasmania*, 198 (1912), with a plate.

FOLLOWING is the original description :—

Arbor mediocra, altudinem 40–50 pedes attinens; ramusculi teretes, graciles. Cortex trunci in laminis duris, similiter "Peppermint" generis. Folia alternata, semi-coriacea, angusta lanceolata v. lineata (tæniola) 12 uncias longa, ½ uncia lata; venis parum insignis acutis obliquis, vena peripherica a folii margine conspicue remora. Pedunculis axillaris, solitariis 5–9 floris pedicellis vix ullis. Calyx turbinatis operculum hemisphericum v. conicum. Fructus turbinatus, margo contracto, concavo, ½ uncia longa, ¼ uncli lata, valvæ prorsus inclusæ.

A tree about 40 to 50 feet high and 2 feet in diameter, with a "Peppermint" bark. "Sucker" leaves linear-lanceolate, straight, 4 to 6 inches long, ½ inch wide, opposite or alternate. Normal leaves narrow-linear to linear, lanceolate, up to nearly 1 foot long, thin, venation not pronounced, but best seen in larger leaves, lateral veins very oblique, intramarginal vein removed from the edge. Peduncles axillary, but (through the falling off of the leaves) the inflorescence sometimes appears paniculate. Flowers few in the head. Calyx pyriform; operculum small, compressed, slightly pointed.

Fruits pear-shaped, ½ inch long and ¼ inch wide, tapering into a short pedicel, rim countersunk, valves not exserted.

RANGE.

The specimens upon which this species is founded were obtained by Mr. L. G. Irby, at St. Mary's Pass, Tasmania.

AFFINITIES.

1 and 2. With *E. Sieberiana* F.v.M., and *E. amygdalina* Labill.

In its native habitat—

It was found growing amongst trees of *E. virgata* and *E. amygdalina* Labill., and from which he (Mr. Irby) states the species is easily differentiated in the field from its congeners. The bark is finer checked than *E. virgata*, running more closely to the "Peppermint" bark in texture than the latter species.

The leaves, both "sucker" and normal, are much narrower than those of *E. virgata,* and of a different appearance altogether. They are long and linear, varying greatly in length on the same tree, being from 4 to 11 inches long—7 to 8 inches long being common. It is on the ribbony appearance of the leaves that the specific name is founded.

The fruits, however, are almost identical with those of *E. virgata,* and yet the general appearance of the tree is more like that of *E. amygdalina.* (L. G. Irby.)

"These results indicate that this form is somewhat closely associated with the Tasmanian *E. virgata.* The oil from the latter, however, contained more eucalyptol and more eudesmol, while that of *E. tæniola* had more phellandrene, as indicated by the rotation figures." (Original description.)

In the above passages, for *E. virgata* Sieb. (a shrubby tree as its name denotes), read *E. Sieberiana.* For an account of the confusion that has grown up between *E. virgata* and *E. Sieberiana* see Part XXXIX, p. 283. *E. virgata* is not found in Tasmania. *E. taeniola* seems sufficiently separated from *E. Sieberiana* by its fibrous or "peppermint" bark, and from *E. amygdalina* by its long linear juvenile leaves.

The following note by L. Rodway, the Government Botanist of Tasmania, expresses a view which will doubtless be borne in mind :—

In the neighbourhood of St. Mary's Pass, Mr. Irby observed in the forest of mixed Mountain Ash and Black Peppermint (*E. Sieberiana* and *E. amygdalina*—J.H.M.) a few trees which differed from either, but were called Black Peppermint by local inhabitants. The trees were medium-sized, with a rough, persistent, semi-fibrous bark. The juvenile leaves were narrow, opposite, and sessile, very like those of Black Peppermint. The mature leaves also resembled the leaves of that species, only tended to grow much longer. Flowers and fruit smaller than, but much like those of Mountain Ash. Fruit is pear-shaped, much restricted at the orifice, rim narrow, valves deeply sunk; stalks slightly flattened. R. T. Baker described it as a new species under the name of *E. tæniola,* but it seems probable it is a hybrid between Black Peppermint and Mountain Ash. (*Proc. Roy. Soc.* Tas., 12, 1917.)

DESCRIPTION.

LXXXII. E. Stricklandi Maiden.

In the original description, copied at Part XVI, p. 202, this little-known species is presumed to be a shrub. The following statement by Mr. C. E. Lane-Poole, Conservator of Forests of Western Australia, shows that it is really a medium-sized tree.

> It does not grow to a large size. In fact, the one photographed is the largest that I was able to find (the photograph, which will be reproduced later, shows an erect tree perhaps 50 feet in height, and with a stem diameter of, say, 2 feet J.H.M.). It has the largest fruit of any of the tree-Eucalypts as opposed to the Mallees, the fruit being as large as, if not larger than, the Tuart, *E. gomphocephala*, of the South-West. The bark adheres for 2 or 3 feet from the ground. The rest of the stem is, however, perfectly clean. The leaves are more coriaceous than any of the other Eucalypts, the nearest being *E. torquata* (Mr. Lane-Poole is of course speaking of the local or Gold Fields Eucalypts, J.H.M.), though, owing to the decorticating bark, there is no difficulty in distinguishing between the two, even in the distance. It is used for fuel, and is known as Blackbutt; indeed, the cutters see no difference between it and *E. Le Souefii*.

The rough part of the bark, at the butt, is hard and flaky. The timber is of a rich deep brown colour, with a touch of red in it; it is very hard and interlocked, and there is no doubt it is of a high class. It seems a pity that practically its only use at present is for fuel.

RANGE.

It is confined to Western Australia, and the only previous locality known is Hampton Plains, near Coolgardie. Mr. C. E. Lane-Poole sends it from 4 miles south of Higginsville, on the Norseman road. It is fairly common along the Norseman road.

I have received from Prof. T. G. B. Osborn, of Adelaide, a specimen labelled :—

1. *Eucalyptus obcordata* Turcz. Elder Exploring Expedition, 40 miles south-west of Fraser Range, Western Australia. (R. Helms, 5th November, 1891.) This is evidently referred to by Mueller and Tate in *Journ. Roy. Soc. S.A.*, xvi, 358.

In the Journal of the Expedition, p. 128, I find under 4th (not 5th) November—

> . . . when we came to a big patch of splendid Blackbutt timber the natives turned off for this rock-hole. The Blackbutt timber is of the Eucalyptus species; it is a useful timber, splitting easily. The natives make their long spears out of this wood.

On the following day the Journal speaks of a " Morrell Gum-tree." The latitude for the two days was given at 31° 35′ 45″ and 26′ 20″, and the locality about 100 miles south-east of Coolgardie.

E. Stricklandi could readily be taken for a Morrell.

2. In Part XXXV, p. 122, and XVI, p. 204, of this work, I refer to a specimen labelled similarly to No. 1 as belonging to *E. Campaspe* Moore. Both specimens were collected on the same date and at the same place.

DESCRIPTION.

CCXC. E. unialata Baker and Smith.

In *Papers and Proc. Roy. Soc., Tasmania,* 177, 1912.

FOLLOWING is the original description :—

Arbor altitudineum 40 pedes attinens, ramulis validis superne quadrangulatis. Folia opposita sessile oval v. cordata acuminata 2–3 uncias longa, v. falcato-lanceolata 9 inches longa, 1 inch lata, obscure pennivena, vena peripherica a margina remotiuscula. Pedunculi axillari, brevi 3 uncias longi, complanati 3 flori; calyx tubus compressus circiter 2 uncias longus cum operculo conico obtuso.

Fructus hemispherici, vitrei unialata, 6 inches longi; margo crassus valva exserta.

Systematic Description.—A tree attaining a height of 30 to 40 feet and a diameter of 12 inches, with a flaky bark at the butt. Sucker leaves, sessile, opposite, oval at the first, the lower pairs nearly always so, up to 2 inches long and 1 inch wide, then cordate, acuminate, up to 3 inches long and 1½ inch wide. Normal leaves lanceolate, falcate, up to 9 inches long and 1 inch wide, subcoriaceous, occasionally shining on the upper surface. Venation distinct, lateral veins moderately oblique, intramarginal vein removed from the edge. Branchlets in sucker growth terete, but angular at first on the others. Peduncles axillary, flattened, short, thick, ¼ inch long, three sessile flowered. Calyx compressed, angular, under ½ inch long; operculum conical.

Fruit hemispherical, ½ inch in diameter, shining, rim thickened, convex with a very narrow groove below it, valves well exserted.

SYNONYM.

E. viminalis Labill., var. *macrocarpa.* Rodway in "Tasmanian Flora," p. 57 (1903). This is dealt with under *E. viminalis* at p. 9.

RANGE.

It is confined to Tasmania, the only localities known at present being the Government Domain at Hobart, Mount Nelson Range, overlooking the Derwent, and Colebrook.

AFFINITIES.

1. With *E. goniocalyx* F.v.M.

In the angularity of the buds are traces of a resemblance to *E. goniocalyx*, but as these mature in the fruit the angles disappear, but traces remain and form distinct convex ridges extending from the rim to the base, and as one is generally much more pronounced than the others, it is upon this character that the specific name is bestowed. (Original description.)

Many years ago (1902) I held the opinion that an affinity was with *E. goniocalyx*, but thought it was *E. Maideni* F.v.M., as shown in the next paragraph.

2. With *E. Maideni* F.v.M.

I have been favoured with an excellent series of specimens from Mr. Rodway, and they match *E. Maideni* F.v.M., from a type locality (Colombo, Lyttleton, N.S.W.) exactly. Whether *E. Maideni* is an extreme form of *E. globulus* or not is worthy of further examination, and Mr. Rodway's specimens and observations (*infra*) are worthy of note in connection with any experiments to reproduce certain species from cultivation of existing forms. My present view is that *E. Maideni* is as near midway as can be between *E. globulus* and *E. goniocalyx*, and therefore I am unable to reduce it to a form of either. If my determination is correct, and I have no doubt about it in my own mind, then another species is added to the flora of Tasmania. (Maiden in *Rep. Aust. Assoc. Adv. Science* (Hobart), ix, 374 (1902)).

While in 1902 I had considered this a form of *E. Maideni*, I had dropped this view in *Proc. Linn. N.S.W.*, xxx, 499 (1905), and my three years later opinion should have been quoted by Messrs. Baker and Smith. I came round to Mr. Rodway's view that it was a hybrid, and added, "Some of the juvenile foliage in my possession is coarser than any I have seen in *E. viminalis*, and I think that Mr. Rodway's statement that this form only occurs in plantations of *E. viminalis* growing with *E. globulus* is a sufficient explanation." From that day to this I understood that the specimens came from a plantation, and in view of the fact that Messrs. Baker and Smith state that only two trees were found, they require further examination, which I will give on my next visit to Tasmania. (Maiden in *Proc. Roy. Soc. Tas.*, xxix, 1914).

3. With *E. viminalis* Labill.

Mr. Rodway is, however, of opinion that his specimens belong to *E. viminalis*, and he proposes to call the variety *macrocarpa*, and the remarks of such an experienced observer require the most careful attention. I am of opinion that the sucker-leaves are of *E. Maideni* rather than *E. viminalis*. The locality is Domain, Hobart, and Mount Nelson Range, and the plant is worthy of further inquiry.

Habit and leaves as in typical *viminalis* to rather more erect, and leaves slightly larger. Mature bud 1·5 cm. long by 8 mm. Operculum sub-hemispheric to conical, smooth. Fruit of the type only 1·2 cm. diameter, often obscurely 2-ribbed.

This form I have only found in plantations of *E. viminalis* growing with *E. globulus*. I take it to be a hybrid. Of six seedlings grown from seed of the same tree, four were closely approximating *E. viminalis*, one *E. globulus*, and the sixth intermediate. (Maiden, *loc. cit.*).

Three years later I wrote –

E. viminalis Labill. var. *macrocarpa* Rodway (in his "Tasmanian Flora," p. 57 (1903) (*E. globulus* Labill. x *viminalis* Labill.).

Some time ago I expressed the opinion that the above form is identical with *E. Maideni* F.v.M. Having received better seedlings from Mr. Rodway than I originally possessed, I incline to Mr. Rodway's view that it is nearer *viminalis*, and I also accept the view, which I resisted at the time, that it is a hybrid

Some of the juvenile foliage in my possession is coarser than any I have seen in *E. viminalis*, and I think that Mr. Rodway's statement that this form only occurs in plantations " of *E. viminalis* growing with *E. globulus* " is a sufficient explanation.

The seedlings of *E. Baeuerleni* F.v.M. are identical with those of Mr. Rodway's variety. The fruits also have much in common, but those of Mr. Rodway are usually more domed. The rim of the junction of the calyx and operculum is very prominent in *E. Baeuerleni;* I have not ripe buds. The ripe buds of var. *macrocarpa* are rounded and glaucous.

The two forms (so called) of *E. viminalis*, viz., var. *macrocarpa* and var. *Baeuerleni* are undoubtedly closely related. I think var. *macrocarpa* is a hybrid of *E. viminalis* x *globulus*. Whether *E. Baeuerleni* is also a hybrid I cannot say, but I incline to think it is, the parents being possibly *E. viminalis* and *E. Maideni* F.v.M. (*Proc. Linn. Soc. N.S.W.*, 499 (1905)).

4. With *E. globulus* Labill.

This (*E. unialata*) is referred to as *E. viminalis* var. *macrocarpa* by Rodway in " The Tasmanian Flora," p. 57 (1903), where it is first suggested as a cross between *E. globulus* and *E. viminalis*.

In this Journal, p. 29 (1914) I suspended my judgment as to its systematic position until I could see the trees growing naturally. Rodway, this Journal, p. 17 (1917), again refers to this tree.

In February, 1918, under Mr. Rodway's guidance, I observed a number of the trees in the Domain at Hobart. I may say that I had long been satisfied that the trees were different from *E. viminalis* and *E. globulus*, but I had understood that they had only been found in a plantation and were not spontaneous; I desired to see them before I wrote again. I am quite satisfied that they are spontaneous, and that they are natural hybrids, and that it is expedient that they should have a distinctive name. I therefore concur in Messrs. Baker and Smith's action.

The Domain trees are large, and there are many of them. They also occur at Nelson's Range, near Sandy Bay, and Mr. Rodway informs me that they are not uncommon at Colebrook (late Jerusalem) on the main line, 25 miles from Hobart. In all cases *E. unialata* occurs intermixed with *E. globulus* and *E. viminalis*. Doubtless they will be found in many other localities.

Mr. Rodway's observation that it is a hybrid between these two species (first recorded in 1903) is quite obvious, and it is one of the simplest cases of natural hybridisation in the genus known to me. The cross is seen in the tree generally, in juvenile leaves, buds, and fruits.

It is testimony to the sound judgment of the late M. Naudin of the Villa Thuret, Antibes, in the South of France, that he detected it as something different from *E. viminalis*, and only last year M. Trabut described it as new, under the name of *E. antipolitensis*, and I append a translation of his description. This is not the first occasion I have had the pleasure of drawing attention to the excellent Eucalyptus work of these French botanists. (Maiden in *Proc. Roy. Soc. Tas.*, 89, 1918.)

I have no doubt that we have here a natural hybrid, of which *E. globulus* is one of the parents. Its relations to *E. antipolitensis* Trabut will be discussed when the general question of Hybridisation is dealt with in the next Part (LII).

DESCRIPTION.

XXXI. E. Planchoniana F.v.M.

A NOTE on this species will be found in Part IX of the present work, and it has been represented to me that a figure would be desirable. There is a figure in Plate 90, Part XXIV of my "Forest Flora of New South Wales," but the present figures add something.

The flowers are pale yellow or creamy white, and notes in regard to bark and timber will be found under Range. Besides the note in the "Forest Flora" quoting the dedication to M. Planchon, see also under *E. globulus* in the "Eucalyptographia."

RANGE.

It is a coast species, and I am not aware that it has been recorded from further south than Camden Haven. It extends along the coast as far as Queensland. Immediately opposite Laurieton, on the other side of the Camden Haven River, near the coast, are some trees of this, then a rather rare species. It is here found over an area of about a mile, by half a mile broad.

In the Brisbane district it attains a height of, perhaps, 100 feet, and a diameter of (say) 3 feet (Bailey). The same dimensions were given in regard to trees near Kempsey, New South Wales. About Camden Haven the trees are poor and pipy; a solid one could not be found. Their height goes up to (say) 30 feet, with a diameter of 15 inches, but the trees are of stunted growth.

The following notes include additional particulars:—

It has also been found in a more inland locality by Mr. E. C. Andrews, viz., Glen Elgin, about 30 miles north-easterly from Glen Innes, or about 20 miles easterly from Deepwater, and on the eastern watershed. He adds the following note:—

> The more precise locality is Pheasant Creek, 18 miles north-north-east from Glen Elgin. Occurs at an altitude of 3,000 feet on an extremely acid variety of granite. Very rocky and sandy country, almost indistinguishable from Hawkesbury sandstone tope, around National Park and Hornsby.
>
> **Habit.** Tall, upright, thin tops. Huge bunches of fruits, very noticeable from ground (50–70 feet below).
>
> **Associates.** *E. corymbosa*, *E. pilularis*, Stringybark (species unknown), *Pimeleas*, *Styphelias*, *Boronias*, *Waratahs*, *Xanthorrhœas*, and various other sand loving plants.

Mr. J. L. Boorman, Collector, Botanic Gardens, visited Mr. Andrews' locality, and furnished the following note :—

> It occurs with the Waratah (*Telopea speciosissima*) more or less over an area of 100 square miles, *i.e.*, from Boundary Creek east to Pheasant Creek, north to Moojam, south to Tindale, and to the west, following the Dividing Range. It is known locally as Red Mahogany, because of the similarity of its bark to that of *E. resinifera*, but it has not a red timber like that tree; it is also known as Needle Bark, because it is prickly to rub down with the hands. The name Porcupine Stringybark is also applied to it for the same reason.

> "I have found it growing from Coff's Harbour to close to South Grafton; the range seems to be extensive. I have not found it growing off the gravelly (ironstone) ridges, and never on flat country. It attains a height of 60 to 70 feet, straight trunks; the matured trees are very unsound (large pipes). The average length of logs 24 feet, the girth 6 feet 6 inches. There is no abundant supply of good trees, though they grow in clumps. I have seen the logs sold for White Mahogany when barked. On one occasion a hauler had the audacity to dispose of a log as Blackbutt, which was converted and sold on the Sydney market as such." (A. H. Lawrence, Forest Guard.)

Found at Corindi Creek, 8 miles north of Woolgoolga, on the Grafton road. Is plentiful in Woolli Woolli State Forest, between Woolgoolga and the Clarence. It is used for general hardwood purposes, weather-boards, flooring, &c. It is a tree attaining a height of 120 feet. It resembles Tallow-wood at a distance, but the bark is of a more stringy nature, resembling stringybark. It is known as "Messmate."

The above particulars were obtained from a report by Assistant Forester C. O. Love.

Mr. Forest Guard G. Boyd reports on the same area. He says it is known as "Yellow Stringybark." It has light yellow flowers, and although called Stringybark, the bark is short-grained and of no value for roofing as our other Stringybarks. It occurs at Woolli Woolli State Forest, No. 23, Bookram Creek, eastern slopes of Coast Range, at 10–200 feet in elevation above the sea. Height 50–80 feet, diameter up to 3 feet.

The type came from Eight Mile Plains, Brisbane (F. M. Bailey) and W. Baeuerlen recorded it from the Evans River, near the Richmond.

DESCRIPTION.

XXI. *E. marginata* Sm.

See Part VIII, p. 241 (1907).

THE following additional statement was published by me in *Journ. W.A. Nat. Hist. Soc.*. vol. iii, January, 1911 :—

> These notes are based on field observations made by me in Western Australia from September to December, 1909, but I have taken the opportunity of incorporating a few notes from other sources.
>
> Mr. William Dunn, a native of Albany, over 60 years of age, says that Mahogany is the name given by the old settlers to the timber later on known as Jarrah; that he does not remember the name Jarrah ever having been employed until the introduction of saw-milling machinery; he has sawn timber from boyhood.
>
> In bark, and somewhat in general appearance, the Jarrah resembles the *E. resinifera* of coastal New South Wales and Queensland. It flowers as a shrub.
>
> Following is a description of the juvenile leaves. They were received from Mr. Max Koch, and have not been previously described :—
>
> Lanceolate, sharply acuminate, slightly oblique, rounded at the base, petiolate; thin in texture, pale on the underside, glabrous on both sides; margin thickened and slightly recurved, the intra-marginal vein distinctly removed from the edge; midrib distinct, lateral veins fairly distinct, pinnate, at an approximate angle of 45 degrees with the midrib, smaller veins anastomosing and obvious; oil-dots not obvious.
>
> The irregularly striate appearance sometimes seen in fruits of this species and in a few others, *e.g.*, *E. diversicolor*, is the result of the contraction of subsucculent vascular tissue over longitudinal bands of fibro-vascular tissue.

E. marginata is termed " Mahogany " or " Jarrail " (can it be a misprint or an early spelling of Jarrah ?) (" Discoveries in Australia," J. Lort Stokes, ii, 132, 1835).

VARIETY.

E. marginata Sm., var. *Staerii*, Maiden in *Journ. Roy. Soc. N.S.W.*, xlvii, 230 (1913).

King River road, near Albany, Western Australia (J. Staer, August, 1911).

The fruits of the normal species, as figured by Mueller in the " Eucalyptographia " are depicted as 1·5–2 cm. long and 1·7 cm. broad, and tapering somewhat into a thickened pedicel. I have received from Mr. J. Staer, specimens of *E. marginata* with fruits in the well-dried state rather more than 2 cm. long and broad, and not tapering into the pedicel. Some of the fruits have a well-defined rim. The foliage is coarser than that of the type, and this handsome, large fruited form is evidently a product of special environment.

In the same Journal, liii, 70 (1919) I published the following additional note concerning this variety :—

> Dr. F. Stoward, under No. 111, April, May, 1917, sends this form with the following note—" Stunted Blackbutt," tree 30–35 feet, up to 2 feet in diameter. Grows in the Albany and Denmark districts in large and sandy flats, and is of a stunted nature.
>
> Mr. C. E. Lane Poole points out the similarity of the fruits to those of *E. Todtiana*, but the anthers and the timbers sharply separate the two species. The relation of this proposed variety to the normal form (the Jarrah, *E. marginata*) is worthy of local inquiry.

DESCRIPTION.

CCXCI. E. Irbyi Baker and Smith.

In "Research on the Eucalypts," 2nd edition, 242 (1920).

FOLLOWING is the original description :—

A small tree, with a smooth, pale or ashy-coloured bark. Abnormal leaves broad-ovate to ovate, sometimes mucronate, petiolate, base rounded, truncate or slightly cordate, fairly thick and coriaceous. Normal leaves coarse, lanceolate to broad-lanceolate, or even ovate, acuminate, up to 8 inches long, mostly straight, on unusually long petioles; venation often indistinct, intramarginal vein looped, well removed from the edge, lateral veins spreading, distant, inclined at an angle of 30–40 degrees to the midrib. Peduncles angular, axillary, 1 to 2 lines long, bearing umbels of mostly three flowers. Buds shortly-pedicellate; calyx-tube turbinate, 2 lines in length; operculum blunt, conical, often slightly broader than and more than half as long as the tube.

Fruit hemispherical to sub-cylindrical, glaucous, or shining; rim flat to convex, often somewhat depressed, cracked transversely; valves more or less exserted; 3 lines long and 3 lines in diameter.

RANGE.

The type comes from Alma Tier, Interlaken, Tasmania, growing amongst *E. Gunnii* (L. G. Irby, now Conservator of Forests of that State) and so far it has not been found out of that island.

AFFINITIES.

1. With *E. Gunnii* Hook., f.

Some of the fruits are so like the hemispherical form of *E. Gunnii*, that when the material was first collected it was placed tentatively with that species until other characters could be worked out, but it is, however, a much coarser plant morphologically than that species . . . . , from which species it differs in the physical features of its bark—lacking the sweet nature of the sap of *E. Gunnii*, which can always be obtained by cutting the bark, and from which it derives its common name of "Cider Gum." In foliage it is not unlike *E. Dalrympleana* J.H.M. Its affinities lie equally between *E. viminalis*, on the one hand, and *E. Gunnii*, on the other, so that, in a systematic arrangement, it might be placed between these two. (Original description.)

2. With *E. viminalis* Labill.

Mr. L. G. Irby: " . . . . thought at first it was *E. viminalis* from the abnormal (juvenile, J.H.M.) leaves, but noted its differences in other respects from the normal material of that species collected in other localities in Tasmania during his trip. An exhaustive oil determination, made since publishing our Research on the Eucalypts of Tasmania in *Journ. Roy. Soc.* (Tas.), 1912, confirmed our suspicion that it was new. In that paper it was placed tentatively under *E. viminalis.* The chief specific differences from this latter are the broader abnormal (juvenile, J.H.M.) and normal leaves, both of which are much coarser than those of *E. viminalis,* and are always affected with a fungus, which is never so in *E. Gunnii* or *E. viminalis,* and which gives the whole plant a black, dirty-looking appearance. This is evidently a specific character by which it can be determined, just as in the case of *E. camphora.* The fruits are, however, identical in shape with those of *E. Gunnii.*" (Original description.)

3. With *E. Dalrympleana* Maiden.

(See above under No. 1, *E. Gunnii*). This species will be found described in Part XLIX of this work. The foliage of *E. Irbyi* is glaucous, even dull-coloured.

DESCRIPTION.

CCXCII. E. Yarraensis Maiden and Cambage, n.sp.

FOLLOWING is the original description :—

Arbor formæ modicæ. Cortex trunci et ramorum breviter fibratus.

Folium maturum.—Undulatum, nitens, paulo obliquum, late lanceolatum. Systema venarum lucida, diffusa: angulus venis secundariis cum costa centrali factus circiter 30°; vena intra marginem satis magno intervallo a labro est.

Flores.—Modus florescere paniculatus, umbellæ cum parvis tribus ad quinque floribus qui in pedunculis et pediculis gracilibus geruntur. Et operculum tubus-que calycis conoidales, cum linea maxima dimetiente infra quinque mm. Antheræ aperientes in fissuris parallelis.

Fructus.—Linea dimentiens infra sex mm.; in forma hemisphærii; valvularum apices (tres aut quatuor) clare exserti.

A leafy tree of medium size, branches and branchlets terete and pendulous, the bark shortly fibrous (woolly) on the trunk and branches (Rhytiphloiæ). Timber pale.

Leaves not seen in their earliest stage, but the lowest leaf in Plate 211 probably closely resembles the juvenile leaf.

Mature leaf.—Undulate, shining, equally green on both sides, thinnish, petiolate, somewhat oblique, broadly lanceolate, terminating at the apex in a blunt point, gradually tapering at the base into a petiole of about 2 cm. The length of the leaves is under 1 dm., with the greatest average width of 2–3 cm. Venation distinct, spreading, the secondary veins making an angle with the midrib of about 30 degrees, the intramarginal vein at a considerable distance from the edge, and looped, meeting the tips of the secondary veins.

Flowers.—Inflorescence paniculate, the umbels of 3–5 flowers being supported by slender peduncles of about 5 mm. supporting pedicels of half that length. The buds symmetrical, both operculum and calyx-tube conoid, the greatest diameter under 5 mm. Anthers opening in parallel slits, a large gland at the back, versatile; filaments creamy-white.

Fruits.—Small, under 6 mm. in diameter, hemispherical, tapering abruptly into the pedicels, rims narrow, the tips of the valves (3 or 4) distinctly exsert.

RANGE.

Valley of the Yarra, near Healesville, Victoria (R. H. Cambage, No. 4340, January, 1921). The type. It will probably be found to occur moderately extensively in Victoria, and perhaps also in Tasmania, when its relations to other species are understood.

AFFINITY.

With *E. ovata* Labill.

E. ovata seems the nearest affinity to *E. Yarraensis.* The former has rough butts, with, in largish trees, flattish ribs of fibrous bark, reminding one of the Turpentines of New South Wales (*Syncarpia laurifolia*), but with smooth branches, and sometimes the upper part of the bark is smooth. *E. Yarraensis*, on the other hand, has the trunk and branches rough throughout. Mr. Cambage wrote at the time of collection, " The typical *E. ovata* is common on the flats around the Upper Yarra, and is quite distinct from No. 4340 " (the present species). Again, the secondary veins of the leaves of *E. ovata* are more transverse than those of *E. Yarraensis*, more approaching an angle of 45 degrees. Further, the inflorescence of *E. Yarraensis* is smaller in all its parts, and, speaking generally, the fruits are more hemispherical.

No. II. THE BARK.

(Continued from p. 331, Part L.)

Following is the remainder of my 1921 Classification. It will be seen that I have adhered to Mueller's 1859 classification as closely as possible, but for the modifications of it, and the species I have placed in the various groups, I am alone responsible :—

1. LEIOPHLOIÆ (Smooth barks or gums).

Mueller's original Group 1 indicated Gums or Smooth Gums. By "Yarra trees" he meant *E. rostrata.* The reason why he stated "Blue Gum trees *partim*" and "Red Gum trees *partim*" in his definition, was because he was aware that the Gums had more or less hardy-flaky or even sub-fibrous bark up the butt. I have below pointed out that a perfectly smooth Gum is an ideal, and, as regards these roughnesses at the lower part of the butt, I have only considered it useful to pick out the "W.A. Blackbutts" for special enumeration as such. This is but one indication that the roughness may be very considerable in a Gum.

The usual or most elementary kind of bark is the smooth one, called the "Gum," and it is more or less glaucous, and more or less thick; we find this bark from the sandy coastal flats to the bleak swamps and mountain areas and away to the arid interior, *e.g.*, White Gum (*E. hæmastoma* Sm.), Red Gum (*E. rostrata* Schlecht). In the interior this is the prevalent kind of bark, with more or less (generally not very much) blackish or hard scaly or flaky-fibrous bark at the butt.

The term Gum is often used as if it were synonymous with Eucalyptus, but this is by no means the case. It is usually only applied to species with barks smooth or nearly so. As a matter of fact, the barks of very few indeed are quite smooth, most species having more or less rough bark (usually hard-scaly or ribbony) at the butt. The word Gum is usually prefixed by an adjective, which is not employed according to a fixed rule. Thus, if the bark be white, the tree may be called White Gum (*hæmastoma, coriacea*); if the foliage be glaucous or blue, we have Blue Gum (*globulus*); if the bark be, by comparison, bluish, we have also Blue Gum (*saligna*); yet no timber is called Red Gum because of the colour of its bark, but of its timber (*rostrata, tereticornis*); while in Western Australia the Red Gum (*calophylla*) is so called because of neither timber nor bark, but because of the profusion of kino which exudes. As a matter of fact it would not in the eastern States be called Gum (certainly not Red), since it is a rough-barked tree and has pale timber. It is, in fact, a Bloodwood.

Some obvious character, such as Broad-leaved, Poplar-leaved, Narrow-leaved, Lead-coloured, is occasionally prefixed to Gum, while to indicate softness or sappiness of bark or timber, or perhaps of both, the prefix Cabbage is not rarely applied (*hæmastoma* var. *micrantha, coriacea*). This by no means exhausts all the designations, for the bushman feels himself at liberty to apply almost any prefix to a Gum (see the indexes to the various volumes of the present work).

Very few barks, perhaps none, are perfectly smooth down to the ground. The perfectly smooth-barked Gum is an ideal. Even in the case of many reputedly smooth barks we have flaky indurated or sub-fibrous bark at the butt, to a varying height up the stem. Most smooth barks are more or less patchy, a typical instance being the Spotted Gum (*E. maculata* Hook. f.). In such barks a roughness in patches becomes visible. At first it is a mere discoloration, but as development proceeds, the area becomes darker and rougher and finally peels off, leaving a pure, new, clean surface, in contrast to which the remainder of the bark appears discoloured. Meantime the process of induration goes on, and the surface last to be new, first peels off or is next to do so, and so the whole of the bark, in its order, goes through the cycle of new, smooth surface, bark of varying degree of roughness, and finally exfoliation. In some cases the patches are long and the older bark contains more fibre, with sufficient tenacity to form long ribbons (*e.g.*, Ribbony Gums, *E. viminalis* Labill.). These are commonly found in the cooler tablelands of the southern and eastern States, and, when rendered supple by the rain and blown about by a strong wind, they stand out like the arms of a semaphore.

The exfoliations referred to fall off in especially great numbers in dry weather. These remarks also apply to the smooth-barked portions (stem and larger branches) of those species which are more or less rough barked. It is frequently difficult to say where a bark commonly described as "flaky" can be separated from a "ribbony" one. In other words, it is impossible to separate "Ribbony Gums" as a distinct section.

The following sections of Gums will, it is hoped, have some value, but, being largely based on the results of environment (moisture, shelter, and soil, all variables), they run into each other :—

A.—*Shaft-like or Columnar*, with smooth, usually white bark, more or less (usually less) rough bark, often ribbony, at the butt. Trunks tending to be cylindrical and tall. Timbers mostly pale and fissile, sometimes red. Rain-forest species. Found on river banks with good soil, and in sheltered valleys generally.

a. With *pale timbers* :—

E. Benthami Maiden and Cambage.
E. cordata Labill.
E. Dunnii Maiden.
E. globulus Labill.
E. goniocalyx F.v.M.
E. linearis A. Cunn.
E. Maideni F.v.M.
E. Muelleri T. B. Moore.
E. nitens Maiden.
E. oreades R. T. Baker.
E. regnans F.v.M.
E. unialata Baker and Smith.

E. Benthami Maiden and Cambage.

A large White Gum, up to 60 or 100 feet and diameter of 6 feet, with more or less rough, flaky bark at the butt. Such rough bark may be almost wholly absent, or sometimes extending to the first fork, but essentially it is a Gum, and can be readily picked out as such along the Nepean Valley, New South Wales. The rough bark is rather hard, but rarely almost fibrous, and terminating in short ribbons. The presence of rough bark, the result of injury (ringbarking in this case) may be very marked in this species, as will be shown in a photograph to be published later.

E. cordata Labill.

Usually a tree with glaucous foliage, but said to exceptionally attain a large size. Bark smooth. Mr. L. Rodway, of Hobart, writes to me that at Cape Frederick Henry, Brown Mountain, and Ridgeway it is a scrambling to semi-erect shrub, of about 4–5 feet. In the south-western gully at Chimney Pot Hill (close to Ridgeway) it is a small tree up to say 20 feet high. At Uxbridge he has seen trees of it approximating 100 feet, and Mr. Fenton, of that town, an experienced timber-cutter, brought him a specimen in typical foliage and flower from a tree he said was 200 feet high with a clean branchless bole for 100 feet, and with timber light-yellow ochre in colour.

E. Dunnii Maiden.

An erect species, attaining a very great size. A White Gum with more or less fibrous-flaky bark at butt. Resembling *E. saligna* in habit a good deal.

E. globulus Labill.

A lofty Gum, called Blue Gum because of its glaucousness, with more or less deciduous ribbony bark.

E. goniocalyx F.v.M.

A tall tree, bark smoothish, but with ribbons and more or less roughish and even flaky bark at butt.

E. linearis Dehnh.

A Gum tree of medium size, say up to 100 feet or less, clean-looking tree with clean-looking branches and light tops of narrow leaves. Foliage erect, not pendulous.

E. Maideni F.v.M.

A tall Gum, called Blue Gum because of its glaucousness, with more or less deciduous ribbony bark. It is closely related to *E. globulus*.

E. Muelleri T. B. Moore.

A tall, erect tree, attaining 200 feet. Bark smooth, blotched with red brown, scaly at base, smooth above, often glaucous.

E. nitens Maiden.

This tree, near Bombala, was measured (by W. Baeuerlen in 1889) by tape 3 feet above the ground and found to be 50 feet in circumference. It is a very large tree, growing to a height of 200-300 feet. It is a Gum with a good deal of deciduous bark hanging in strips, and more or less rough at the butt, the upper portion, which usually includes nearly the whole of the trunk, smooth and even shining.

E. OREADES R. T. Baker.

A tall tree with a smooth, whitish bark down to the ground, or sometimes leaving a lighter rough bark 6–8 feet from the ground. Timber fissile.

E. REGNANS F.v.M.

A tall, shaft-like species, with more or less rough, ribbony bark at the butt. In some cases the amount of rough bark is very small, giving the impression of a Gum, in others, in drier situations, the bark is dark coloured and peppermint-like. Timber specially fissile. This is probably the highest tree in Australia, attaining a height (measured) well over 300 feet. See my "Forest Flora of New South Wales," vol. ii, p. 161, and also Part VII, p. 183, of the present work.

E. UNIALATA Baker and Smith.

A medium-sized or tall Gum tree, with usually a good deal of deciduous, ribbony bark.

b. With red timbers:—

E. Deanei Maiden.
E. diversicolor F.v.M.
E. grandis (Hill) Maiden.
E. Naudiniana F.v.M.
E. saligna Sm.

E. DEANEI Maiden.

A very large, bulky tree, up to 200 feet. Sometimes gnarled and scrambling in habit, but usually a straight tree with more or less rough bark at butt, and a large umbrageous head. It is closely allied to *E. saligna*. Sometimes called "Silky Gum" because of the sheen of its bark.

E. DIVERSICOLOR F.v.M.

One of the largest species of the genus. A Gum with more or less flaky-ribbony bark at the butt. Already referred to in Part XX, p. 298, of the present work.

E. GRANDIS (Hill) Maiden.

The principal Flooded Gum of eastern Australia. It is a majestic tree, which attains a height of 90–140 feet, and a diameter of 40–60 inches. Its timber is red and in high repute for strength, lightness, and durability. It is closely allied to *E. saligna*.

E. NAUDINIANA F.v.M.

One of the few species which is extra-Australian. See Part XII, p. 81. A tall tree attaining the height of 100 feet, with a smooth bark.

E. SALIGNA Sm.

A tall, shaft-like tree, with smooth, but more or less sub-fibrous or dark-coloured, scaly bark at the butt.

B.—*More or less erect in habit, but not shaft-like.* Tending to branch, and with more or less rough bark at butt and flaky or ribbony bark on trunk. Denizens of more exposed situations than A.

a. With pale timbers :—

Mostly belonging to the Renantheræ and eastern. Speaking generally, the timbers of the Renantheræ are more fissile (which implies a certain degree of toughness) than the rest.

E. Dalrympleana Maiden.
E. fraxinoides Deane and Maiden.
E. hæmastoma Sm.
E. leucoxylon F.v.M.
E. linearis Dehn.
E. maculosa R. T. Baker.
E. Mitchelli Cambage.
E. numerosa Maiden.
E. Perriniana F.v.M.
E. praecox Maiden.
E. Risdoni Hook. f.
E. rubida Deane and Maiden.
E. scoparia Maiden.
E. Smithii R. T. Baker.
E. viminalis Labill.

(Also a var. of *viminalis*, Dorrigo, New South Wales.)

E. DALRYMPLEANA Maiden.

A massive White Gum, displaying considerable resemblance to *E. viminalis.*

E. FRAXINOIDES Deane and Maiden.

A tall tree, smooth barked, the outer layer falling off in ribbons; the bark blotched, reminding one somewhat of Spotted Gum (*E. maculata*) as regards its blotches, and *E. viminalis* (Ribbon Gum) as regards the stripping of the outer bark. Timber both pale-coloured and fissile, hence often called "Mountain Ash."

E. HÆMASTOMA Sm.

A tree of medium size, with a smooth, white bark, with usually a little thin, hardy, flaky bark at the butt. Often not a long barrel, the trunk being often branched. Canopy moderate. Timber pale-coloured to pink.

E. LEUCOXYLON F.v.M.

A medium-sized to a large tree, smooth-barked, but with more or less deciduous flaky bark, falling away in patches.

E. LINEARIS Dehn.

Tree of medium size, say up to 100 feet, with smooth, slightly ribbony bark (the smooth portion of a yellowish cast) and very little scaly bark except perhaps a little at the lowest portion of the butt. Clean-looking tree, with clean-looking branches and light tops of narrow leaves. The foliage rather erect, certainly not pendulous, although occasionally slightly so. This is a White Peppermint, according to the Adventure Bay people and also Mr. Rodway. This tree differs from *E. amygdalina* as we know it, in two important points :—

(1) An erect, smooth-barked (not rough-barked) tree.

(2) Foliage erect, not pendulous.

E. MACULOSA R. T. Baker.

A White or blotched Gum, rarely exceeding 60 feet in height.

E. MITCHELLIANA Cambage.

An umbrageous tree up to 50 feet high, with a stem-diameter of 2 feet. Bark smooth and white, except for a few rough flakes at the base.

E. NUMEROSA Maiden.

A medium-sized to rather tall, rather slender tree, essentially a White Gum, with sub-fibrous or Peppermint butt, succeeded by especially long ribbons, so tough that they were used by the aborigines for tying purposes. It is known as Ribbony Gum. The timber is white and fissile.

E. PERRINIANA F.v.M.

A semi-pendulous small, or medium-sized White Gum, with the usual deciduous patches. Timber brittle.

E. PRÆCOX Maiden.

A small Gum tree of drooping habit.

E. RISDONI Hook. f.

A smooth-barked tree of medium size, but always more or less scaly at the butt.

E. RUBIDA Deane and Maiden.

A medium-sized tree, perfectly smooth for the most part, the outer layer of bark falling off in ribbons. The "bole and limbs very white, as if whitewashed." The name "Candle-bark" is also excellently descriptive of the appearance of the bark in the most southern parts of New South Wales and north-eastern Victoria. It frequently exhibits reddish or plum-coloured patches (hence the specific name); this is a colour rarely, if ever, seen in *E. viminalis*.

E. SCOPARIA Maiden.

A slender tree of 30-40 feet, with narrow, pendulous foliage, and an entirely smooth white bark.

E. Smithii R. T. Baker.

A ribbony-barked tree of considerable size. It has smooth limbs, and most of the butt is smooth.

E. viminalis Labill.

A tree usually of moderate size, but sometimes attaining a great height, with a rough, persistent bark, at least on the trunk and main branches; that of the smaller branches often smooth and deciduous, and sometimes the whole described as deciduous. Mueller quotes it up to 320 feet high, with a diameter of 17 feet or 20 feet. While it is undoubtedly a large tree, I would like such an extreme size to be authenticated. It is a White Gum, with more or less hard, dark bark at the butt. It is also called Ribbony Gum, the ribbons being sometimes very long. While it is usually smooth and white from the base, sometimes the trunk is coarsely scaly, or scaly-fibrous, even to the upper branches. See Part XXVIII, p. 167.

b. *With red or reddish-brown timbers*:—

It is sometimes very difficult to say where red ends and reddish-brown begins, particularly because the latter tint is often a sign of over-maturity of a normally red timber.

E. accedens W. V. Fitzgerald (reddish-brown).
E. amplifolia Naudin.
E. Blakelyi Maiden.
E. Dawsoni R. T. Baker.
E. intertexta R. T. Baker.
E. Lane-Poolei Maiden (reddish-brown).
E. microtheca F.v.M. (in part).
E. Parramattensis Hall.
E. rostrata Schlecht.
E. Seeana Maiden.
E. tereticornis Sm.

E. accedens W. V. Fitzgerald.

A medium-sized tree, a sturdy White Gum, attaining a height of 60 feet and a diameter of 2 feet. Bark greyish or white, with the usual lenticular patches, hence the name "Spotted Gum"; called a "powder bark" because of the pulverulence of the outer surface. The timber is pale-reddish brown when fresh, and of course darkens with age.

E. amplifolia Naudin.

A medium-sized tree with coarse foliage. Bark smooth or more or less ribbony.

E. Blakelyi Maiden.

An erect tree of medium size with smooth, more or less, blotched bark.

E. Dawsoni R. T. Baker.

A tall tree with smooth bark more or less falling away in lenticular flakes. Closely allied to *E. polyanthemos*.

E. INTERTEXTA R. T. Baker.

A large tree, up to 80 feet and 3 feet in diameter. It is sometimes called "White Gum"; it is always blotched, and sometimes has rough bark up to 20 feet from the ground. The upper part of the trunk and the branches are smooth.

E. LANE-POOLEI Maiden.

A White Gum, attaining a height of from 40 to 50 feet, and from 2½ to 3 feet in diameter. Being of stunted appearance, has a rather short bole and crooked appearance, although some are 20 feet in length and perfectly straight; the limbs are generally very crooked. The colour of the outside of the trees and branches is whitish in appearance, with a tinge of salmon colour towards the sunny side. There is also a fine white powder on the bark which is easily rubbed off. The bark on some of the trees is of a brownish colour. There is very little deciduous rough bark. Sapwood pale-coloured and thick; timber interlocked and rich reddish-brown.

E. MICROTHECA F.v.M.

Although this tree is normally a rough-barked species, I invited attention to a form of it which is a White Gum—a Powder Bark. See Part XI, p. 53, and also below, p. 39.

E. PARRAMATTENSIS Hall.

A small or medium-sized tree; the bark smooth, whitish, or greyish with deciduous flakes. Timber "pale, pink-coloured," inferior, *i.e.*, brittle and not durable, but it is really red, for it is only pale in saplings.

E. ROSTRATA Schlecht.

A large, picturesque tree, whose bark is mainly smooth, with more or less flaky, deciduous bark. It has the great merit, for a tree yielding a valuable timber, of flourishing in flooded land.

E. SEEANA Maiden.

A smooth-barked tree of medium or large size, with blotches on the bark.

E. TERETICORNIS Sm.

A tall tree with a thick trunk. Smooth bark with deciduous patches or ribbons.

c. *With brown timbers:—*

E. ochrophloia F.v.M.
E. redunca Schau.
E. Thozetiana F.v.M.

E. OCHROPHLOIA F.v.M.

A somewhat erect tree of 40–50 feet. Has usually an erect trunk for 20–30 feet, then it branches obliquely into moderately umbrageous branches. The trunks are up to 3 ft. 6 in. in diameter. It is a Gum, with clean branches, but at the butt of the tree it is very rough scaly, peeling off and very black. Called "Yellow Jacket" owing to the yellow cast of the bark.

E. REDUNCA Schau. var. *elata*.

A large White Gum, the trunk generally swelling out suddenly near the ground.

E. THOZETIANA F.v.M.

An erect, slender, graceful tree, attaining a height of 70 feet. It is a smooth-barked species with but little rough, flaky bark at the butt. "The trunk is beautifully fluted, which appears to be a constant character of this species." (O'Shanesy.) "It is like a Mallee, but I do not think it has the bulbous stock of a Mallee." (C. C. Chapman.)

C. *Scrambling in habit.*—In the present state of our knowledge, B. and C. appear to run into each other, and both into A.

a. With pale timbers:—

- *E. cladocalyx* F.v.M.
- *E. Cooperiana* F.v.M.
- *E. coriacea* A. Cunn.
- *E. de Beuzevillei* Maiden.
- *E. Gunnii* Hook, f.
- *E. Irbyi* Baker and Smith.
- *E. Kitsoniana* (J. G. Luehmann) Maiden.
- *E. megacarpa* F.v.M.
- *E. stellulata* Sieb.

E. CLADOCALYX F.v.M.

An umbrageous tree, a White Gum, more nor less scaly barked like the eastern *E. hæmastoma*. Sometimes the bark more closely resembles that of a Grey Gum (*E. punctata*). Usually called Sugar Gum.

E. COOPERIANA F.v.M.

Particulars concerning this species are not known. It is closely allied to *E. cladocalyx*.

E. CORIACEA A. Cunn.

A White Gum, variable in habit from tall and erect to more or less pendulous, when it is known as Weeping Gum. Sometimes it may be scrambling, and then earns the name of "Tumble-down Gum." It often has a scribbled bark, owing to insect action. This tree is exclusively found at the "tree-line" at Mount Kosciusko in its variety *alpina*.

E. DE BEUZEVILLEI Maiden.

A tree of medium size, up to 60 feet high, a White Gum, more or less glaucous, and more or less rough-flaky bark at the butt.

E. GUNNII Hook, f.

A White Gum, of somewhat scrambling habit, and with the usual deciduous lenticular patches.

E. IRBYI Baker and Smith.

A small tree, with a smooth, pale or ashy-coloured bark.

E. Kitsoniana (J. G. Luehmann) Maiden.

A dwarf Gum tree, up to 30 feet. Bark smooth in texture and ashy-grey in colour, which becomes lighter in the upper branches.

E. megacarpa F.v.M.

A medium-sized gouty Gum tree with stems up to 3 feet. Bark thickish, like a White Gum, or perhaps like a Grey Gum (*E. punctata* of eastern New South Wales). Timber pale-coloured, brownish near the heart; brittle. See also page 40.

E. stellulata Sieb.

A forest tree of medium size in the Monaro (New South Wales) and Gippsland (Victoria), forming a shapely tree of 50 feet in height and more, with a stem-diameter of 2 or 3 feet, and with dense foliage. Sometimes it takes on a straggling habit. It is a Gum, and the bark (see Part V, p. 129) often coloured green, olive-green, or lead-coloured, giving it an unusual appearance.

b. With dark-coloured timbers, red to reddish-brown:—

- *E. alba* Reinw.
- *E. Bancrofti* Maiden.
- *E. cosmophylla* F.v.M.
- *E. dealbata* A. Cunn.
- *E. Drummondii* F.v.M.
- *E. fasciculosa* F.v.M.
- *E. pallidifolia* F.v.M.
- *E. salmonophloia* F.v.M.
- *E. squamosa* Deane and Maiden.

E. alba Reinw.

A typical White or Cabbage Gum. Though not a very tall tree, it has a good trunk, though often scrambling; branches brittle. An entirely smooth bark without flakes. Timber red or reddish-brown, coarse fibred.

E. Bancrofti Maiden.

A tree of medium size, often crooked and gnarled, bark smooth, falling away in irregular patches. Very similar in appearance to *Angophora lanceolata*. It may be phytogenetically a form of *E. tereticornis*.

E. cosmophylla F.v.M.

A smooth-barked tree, the exfoliating bark coming off in irregular patches, never hanging in strips.

E. dealbata A. Cunn.

A scraggy, small tree, never quite a Gum, but with the bark falling from the greater part of the trunk and branches in flakes or small ribbons. Often (particularly north and north-west of New South Wales) it is of a Mallee habit.

E. Drummondii F.v.M.

A White Gum, small in size, with the usual flaky-deciduous bark.

E. fasciculosa F.v.M.

A White Gum of medium size, the bark somewhat flaky at the butt. Timber deep reddish-brown.

E. PALLIDIFOLIA F.v.M.

A crooked tree, bark white to the ground and brittle.

E. SALMONOPHLOIA F.v.M.

"Salmon Gum;" "Nankeen-coloured Gum" of the old writers. A tree up to 100 feet, with a stem-diameter of 3 feet, bark smooth, shining, greyish with a purplish tinge, or sometimes blotched. A very characteristic-looking bark, sometimes a little rough-flaky bark at butt. Timber reddish-brown, "red with crimson in it."

E. SQUAMOSA Deane and Maiden.

A medium-sized Gum, with a scrambling and drooping habit, often stunted. Doubtless a depauperate or decaying species. Bark smooth or scaly, often blotched. Timber deep red.

C. *Western Australian Blackbutts.*—This type is essentially a "Gum," and I would again remind my readers that all Gums practically have some rough, hard, flaky, or ribbony bark on the butt. This class of Blackbutt is not to be confused with the Blackbutt of south-western Australia (*E. patens*) or the more numerous Blackbutts of eastern Australia, of which *E. pilularis* is a type. The latter are characteristic by their sub-fibrous or fibrous barks, and belong to the rough-barked series.

The true Western Australian Blackbutts are trees of medium size, with a diameter of 2 or 3 feet, and have usually a cigar-brown timber. The following go under the name of Blackbutt in Western Australia:—

E. celastroides Turcz.
E. Clelandi Maiden.
E. confluens (W. V. Fitzgerald) Maiden.
E. corrugata Luehmann.
E. Dundasi Maiden.
E. Flocktoniæ Maiden.
E. gracilis F.v.M. (a form).
E. Griffithsii Maiden.
E. Houseana (W.V.F.) Maiden.
E. Mooreana (W.V.F.) Maiden.
E. le Souefii Maiden.
E. Stricklandi Maiden.
E. transcontinentalis Maiden.
E. Woodwardi Maiden.

E. CELASTROIDES Turcz.

A medium-sized tree, with a trunk 2 feet in diameter. A "White Gum" or "Blackbutt," a little rough bark, which may be Box-like at the butt, smooth above.

E. CLELANDI Maiden.

A Blackbutt. A tree of medium size, bark hard-flaky or fibrous-flaky and blackish at butt, the rest of the trunk and all the branches smooth. Branchlets glaucous, as likewise the whole of the saplings.

E. CONFLUENS (W.V.F.) Maiden.

A small tree, up to 30 feet high, with a diameter up to 1 foot. Bark "persistent, white and smooth." By this I understand that it is mainly a smooth-barked tree, but there is a certain amount of "persistent" bark on the butt. Timber red to brownish-red.

E. CORRUGATA Luehmann.

A tree attaining about 30 feet in height, with a smooth, ashy-grey bark.

E. DUNDASI Maiden.

A species but imperfectly known at present.

E. FLOCKTONIÆ Maiden.

An erect, many-stemmed shrub of 6–8 feet as originally described, but Mr. C. E. Lane-Poole has kindly sent me an admirable photograph by Prof. E. H. Wilson of the Arnold Arboretum, U.S.A., which shows an erect tree of 40 feet with a diameter of 8 inches. Bark almost perfectly smooth, with the exception of a few flakes. The colour of the timber is indicated by its local name of "Redwood."

E. GRACILIS F.v.M. (the W.A. form).

"Snap and Rattle." Over 2 feet in diameter and up to 60 feet high. It grows in divaricate clumps, but is not Mallee-like. Its timber is cigar-brown. Often it is dwarf and crooked, and with the usual hard, dark-coloured bark found on the short trunk of a Mallee of this size. See also "Mallee," p. 325, Part L.

E. GRIFFITHSII Maiden.

A large White Gum, attaining a trunk diameter of 2 feet in the case of the type at Kalgoorlie. The bark is somewhat ribbony, box-scaly at butt. A photograph at Widgiemooltha shows a tree of 60 feet high with a diameter of 2 ft. 6 in., with the rough bark about 12 feet up.

E. HOUSEANA (W.V.F.) Maiden.

A tree up to 70 feet high, with a diameter up to 2½ feet, bark persistent, white to greyish-white, smooth. By this I understand a White Gum, but I do not understand the meaning of the word "persistent" in this case. Timber reddish.

E. MOOREANA (W.V.F.) Maiden.

A small, crooked tree, up to 30 feet high, glaucous all over. A White Gum with reddish timber.

E. LE SOUEFII Maiden.

A tree of medium size, bark flaky at the butt, the greater portion of the trunk and the whole of the branches smooth. So far the type and a photograph of a tree by Prof. E. H. Wilson at Widgiemooltha shows a tree of 50 feet with a diameter of 2 feet, with the rough bark up to the first fork, say 10 feet.

E. Stricklandi Maiden.

I have excellent photographs both by Prof. E. H. Wilson and by Mr. C. E. Lane-Poole. The former gives the measurements of his tree as 35 feet, with a diameter of under 2 feet; the latter says it does not grow to a large size. The bark adheres for 2 or 3 feet from the ground; the rest of the stem, however, is perfectly clean. Timber rich deep brown.

E. transcontinentalis Maiden.

A medium-sized tree. It is a White Gum or Blackbutt, with blotched bark, and more or less short, flaky ribbons on the trunk. I have excellent photographs by both Prof. E. H. Wilson and Mr. C. E. Lane-Poole. The height of the tree in the former's photograph is given at 65 feet with a stem diameter of over 2 ft. 6 in. Mr. Lane-Poole speaks of it as "a fine, clean-stemmed tree mixed with Gimlet (*E. salubris*) and Salmon Gum (*E. salmonophloia*) all through the Coolgardie district. It is difficult to distinguish it outwardly from *E. Flocktoniæ*. Both are known as Redwood (colour of timber rich reddish-brown), and are used indiscriminately as fuel for the mines."

E. Woodwardi Maiden.

A tree of 40–50 feet, bark smooth, somewhat scaly at the butt, all parts very glaucous, almost mealy.

D. *Gimlet Gums.*—So called because the stem is twisted like a gigantic corkscrew rather than a gimlet. The typical species (*salubris*) belongs to Western Australia.

E. salubris F.v.M.
E. Campaspe S. Moore.
E. occidentalis Endl. var. *astringens* Maiden (note only).
E. Thozetiana F.v.M.

E. salubris F.v.M.

Gimlet Gums. A medium-sized or tall tree, the whole stem often twisted like a gigantic corkscrew, less like a gimlet. Bark smooth, shining, ash-coloured. They have a peculiar olive-green hard bark (reminding one of *E. stellulata* of the east a little). Sometimes Gimlet trees have short uniform ribbons all up the trunk; they stick out, and such Gimlets are termed "feathery." Timber pale brown.

E. Campaspe S. Moore.

Very glaucous. "It has no trunk, but the limbs appear to grow and spread from the ground much like a very large Mallee. (Probably because of local circumstances, J.H.M.) Up to 40 feet, and its branches spread and droop like a willow." Has a smooth, thin bark with ribbons. Timber hard, pale coloured, with a little brownish centre. "White Gum with a ribbony bark" (Dr. Webster).

Called "Silver-topped Gimlet" by Mr. Lane-Poole. He says it does not grow to the same size as the true Gimlet (*E. salubris*). I have excellent photographs by Mr. Lane-Poole. Another by Prof. E. H. Wilson gives the dimensions as 35 feet high, with a diameter of 6 inches, will be published later.

In regard to *E. Campaspe*, the stem is just as twisted as that of the Gimlet; if it is not so in the photograph it is simply because that particular tree was a straight one. Wood-cutters can never tell the difference; they call them both Gimlets, so I suggest "Silver-topped Gimlet" to make the distinction. (C. E. Lane-Poole, 2nd September, 1919.)

From the photo you will see that *E. Campaspe* is not a Mallee. It grows to a much larger size and the stem is single. (1st September, 1919.)

E. OCCIDENTALIS Endl. var. ASTRINGENS Maiden.

Trees of this variety seem to somewhat resemble *E. salubris* in general appearance.

E. THOZETIANA F.v.M.

Speaking of this species, O'Shanesy says: "The trunk is beautifully fluted, which appears to be a constant character of this species."

E. *Grey Gums.*—The term Grey Gum is applied to *E. punctata* (which is a typical form) because of the dull grey appearance of the bark. The bark has a roughish or raspy appearance, in contradistinction to a smooth and even shiny one, possessed by so many of our Gums. It has smooth, white patches in places, caused by the outer layer of bark falling off. These white patches in their turn become grey, and the process of exfoliation of the bark is repeated until probably the whole of the bark on the trunk is shed at one time or another. Although rather difficult to properly describe, the bark of the Grey Gum is so characteristic that, when once pointed out, it could not be confused with the bark of any other hardwood tree. They are all large trees, and the first three have red timbers:—

E. adjuncta Maiden.
E. propinqua Deane and Maiden.
E. punctata DC.
E. canaliculata Maiden.
E. maculata Hook.

E. maculata is an anomalous member of the Bloodwood Group; it has a bark reminiscent of the Grey Gums and a pale-coloured timber. It may be looked upon as a transit form between the Grey Gums and the Bloodwoods. *E. canaliculata* is a Grey Gum with pale-coloured timber, and in some respects connects the Grey Gums with *E. maculata.*

E. ADJUNCTA Maiden.

A tree attaining a height of 80 feet, with a diameter of 3 or 4 feet.

E. PROPINQUA Deane and Maiden.

A Grey Gum, very closely allied to *E. punctata.*

E. PUNCTATA DC.

The typical Grey Gum. Bark dull grey in appearance, has a roughish or raspy appearance, in contradistinction to a smooth and even shiny one, possessed by so many of our Gums. It has smooth white patches in places, caused by the outer layer of bark falling off.

E. CANALICULATA Maiden.

A tall species, over 100 feet in height, with a diameter of 4 feet. Timber pale coloured, somewhat coarse-fibred, interlocked and tough.

E. MACULATA Hook.

A tall, smooth-barked tree, more or less blotched, giving it a spotted or mottled appearance, hence the name "Spotted Gum," which was originally applied to this species. Timber pale coloured.

2. HEMIPHLOIÆ (Half-barks).

The illustrative instances Mueller quotes in his 1859 paper are Moreton Bay Ash (*E. tessellaris*), the Blackbutted Gum (a term now archaic and shortened to Blackbutt, of which *E. pilularis* is the type, and Box-trees *partim*, amongst which he probably intended to include *E. hemiphloia*, the tree which was first named Box, but he badly mixed it up when he described it later. See this work, Part XI, p. 14. It includes most of the Peppermints.

The outstanding fact is that the average bushman unhesitatingly does not greet the Hemiphloiæ as Gums, but realises that the rough, sub-fibrous bark proceeds a considerable distance up the butt, often to the first fork. As a rule, the upper part of the butt, and always the limbs, are smooth. The Hemiphloiæ are intermediate between the Leiophloiæ and the Rhytiphloiæ. There are no abrupt stages in Nature, and so it is that sometimes an exceptional member of the Leiophloiæ may have so much rough bark that it verges towards the Hemiphloiæ, while a member of the Hemiphloiæ tends to the rough-barkedness of the Rhytiphloiæ. Nevertheless, the Hemiphloiæ afford us a useful practical classification.

It is remarkable that the vast preponderance of the Hemiphloiæ have pale timbers.

My provisional grouping is—

A.—*Renantheræ*.—Eastern species. Timbers pale. Different members are known, chiefly as Peppermint, but also as Blackbutt and Mountain Ash. The bareness of the branches is sometimes emphasised in the name White Top.

Following is the list:—

E. amygdalina Labill.
E. Andrewsi Maiden.
E. Consideniana Maiden.
E. dives Schauer.
E. gigantea Hook.
E. Laseroni R. T. Baker.
E. Penrithensis Maiden.
E. pilularis Sm.
E. piperita Sm.
E. radiata Sieb.
E. Sieberiana F.v.M.
E. taeniola Baker and Smith.
E. vitrea R. T. Baker.

E. AMYGDALINA Labill.

"Black Peppermint." Often the dimensions of a small shrub, but attaining the size of a small tree. Seems to be confined to Tasmania, so far as we know at present, but I confidently look for it on the mainland. It is undoubtedly a Peppermint with sub-fibrous bark, though smooth when quite small, and with the branches always smooth.

E. ANDREWSI Maiden.

A large tree, known both as Peppermint and Blackbutt. Large trees measure from 150–180 feet. Diameter at least 8 feet. The shape and habit of the tree is a good deal like that of *E. pilularis* with the branches and branchlets more or less smooth. On a low elevation on basalt, bark more fibrous than on higher granite soils.

E. CONSIDENIANA Maiden.

A medium-sized tree with grey tough bark to the tips of the branches, said bark being of that sub-fibrous character well-known in Australia as Peppermint. At the same time it is not a typical Peppermint, and it was once described contemptuously by my driver as having a "mangy-looking bark."

E. DIVES Schauer.

A tree of medium size. A typical Peppermint, usually rather scrambling in habit, with smooth limbs. In southern New South Wales it attains a larger size and grows more erect.

E. GIGANTEA Hook.

Has tall, clean, tapering trunks. The bark on the lower half of the stem very thick and woolly, like Stringybark. This ceases abruptly about half the height of the stem or barrel, no matter what height the tree or length of stem may be. Above this the bark is quite clean, very thin, the old bark peeling off in long, thin strips. Yields a specially fissile timber.

E. Laseroni R. T. Baker.

A medium-sized tree, not quite a Stringybark, and hence known as Bastard Stringybark. The fibrous bark covers the trunk and decorticates in long strips from the main branches, which are otherwise smooth.

E. Penrithensis Maiden.

A tree of medium size, bark hard-fibrous on the trunk, branches smooth, intermediate in character between a Stringybark and a Peppermint.

E. pilularis Sm.

This is the tree which most usually goes under the name of "Blackbutt," and sometimes by way of distinction, for it attains enormous size, the "Great Blackbutt." It is a stately, shapely tree, and perhaps the best known of all the genus to Sydney residents, as it is so abundant. Its rough outer bark is confined to the trunk of the tree, the branches being smooth and white. From the latter circumstance it shares with some other species the designation of "White-top." The outer bark of this tree is fibrous and closely matted, forming a sort of middle link between such fibrous-barked trees as the Stringybarks, and such smooth ones as our White Gum. I do not know that the term "black," as applied to the butt, is particularly appropriate; the word "grey" would be better, though exception could be taken to this adjective also.

E. piperita Sm.

Not very dissimilar to *E. pilularis* in general appearance, but a smaller tree, denizen of rockier conditions and with far inferior timber. Bark sub-fibrous on the trunk, with smooth branches. Sometimes decidedly a ribbony Gum.

E. radiata Sieb.

A tree usually moderate sized, but sometimes attaining a considerable height the bark fibrous and persistent, not so fibrous as that of a Stringybark, and of a looser texture than that of a Box of the character usually known as Peppermint. The fibrous bark occurs only on the trunk or at most on the largest branches. The branches are usually quite smooth or ribbony.

E. Sieberiana F.v.M.

Looked at from some little distance most people would pronounce it an Ironbark, and, because of the clean white branches, it is sometimes known as White Ironbark. Sometimes the rough bark only reaches half way up the stem. The young branches and upper parts of the trunk are often glaucous—indeed, this seems always a character of the species. The bark is, however, by no means so hard as the Ironbarks, nor are the ridges so sharp or well sculptured; the bark is something between that of the Ironbarks and the Stringybarks; indeed it varies in texture between that of these two groups.

E. taeniola Baker and Smith.

A tree of 40-50 feet, with a Peppermint bark.

E. VITREA R. T. Baker.

A shrub or small tree to one of medium size, the bole with persistent bark, the branches smooth. The bark is variously described; thus (1) "Bastard Stringybark, ribbony tops, hard scaly bark, not fibrous"; (2) "Rough and thin and of a dark brown colour, hanging loosely from the stem, in short loose pieces" (Wingello, J.L.B.). "Peppermint. Rough bark about 15 or 20 feet high. Near Oberon, on Hampton-road." (R. H. Cambage). "Smooth bark, except just at butt. Black chippy bark. Three miles south of Marulan, on side of gravelly ridge." (A. Murphy).

It is nearest to a Peppermint.

B. *Boxes, i.e.,* trees with sub-fibrous, interlaced bark and interlocked timber. Eastern Australia; some tropical. Timbers pale-coloured, or at all events not dark-brown, although, if one keeps a timber long enough, it will become very dark. This remark is of general application. The name arose because of the interlocked timber of some of them. This was associated with a certain type of bark, and then we obtained the "box" bark, sometimes irrespective of the boxy nature of the timber.

As regards bark alone, some species may be termed Woollybutts, but the true Woollybutts have red timber.

E. aggregata Deane and Maiden.
E. Banksii Maiden.
E. Bosistoana F.v.M.
E. cinerea F.v.M.
E. hemiphloia F.v.M.
E. Howittiana F.v.M.
E. Macarthurii Deane and Maiden.
E. melliodora A. Cunn.
E. nitens Maiden.
E. Normantonensis Maiden and Cambage.
E. ovata Labill.
E. Pillagaensis Maiden.
E. pruinosa Schau.
E. quadrangulata Deane and Maiden.
E. Yarraensis Maiden and Cambage.

E. AGGREGATA Deane and Maiden.

"Black Gum." Usually a small, gnarled tree, but may be straighter, up to 40 feet, with a trunk of 2 feet. The bark of the butt box-like or rather more flaky, with smooth, dark-green branches.

E. BANKSII Maiden.

"Tenterfield Woollybutt." A very large tree, up to 100 feet, reminding one of *E. goniocalyx* in habit. Bark of a dull uniform grey (not quite smooth, but almost a Grey Gum), woolly or fuzzy (not as soft and as boxlike as *E. Stuartiana*) along the butt, hence the name "Woollybutt." This is a species which runs insensibly into the *Rhytiphloiæ*.

E. Bosistoana F.v.M.

An upright-growing large tree, with a flaky, sub-fibrous bark growing on the trunk to a varying height. The branches smooth, and often the upper part of the trunk. It presents a good deal of general similarity to *E. hemiphloia.* The adjective Yellow refers to the timber, and not to the bark, as in *E. melliodora.*

E. cinerea F.v.M.

A moderate sized or large tree, with a matted, persistent bark, the foliage more or less glaucous. Ragged, fibrous, reddish-brown on trunk and larger limbs, then on smaller limbs, coming off in strips and curling inwards, leaving creamy-white smooth branchlets.

E. hemiphloia F.v.M.

"White or Grey Box," the species to which the name Box was first applied in Australia. Erect in habit, the trunk with a grey, sub-fibrous, compact (Box-like) bark, the branches smooth, or with short ribbons.

Var. *albens* F.v.M.

Glaucousness is a character of this variety.

Var. *microcarpa* Miaden.

A medium-sized or large tree, rather erect in habit, the bark sub-fibrous, rather compact, and greyish or whitish on the trunk, the limbs smooth.

E. Howittiana F.v.M.

A tree attaining a height of about 100 feet, with a girth at the butt of 12 feet "Bark less fissured than that of some of the Box-Eucalypts, more resembling that of the Stringybark trees."

E. Macarthuri Deane and Maiden.

A tall tree, of beautiful form, with a rounded head. The bark rough, somewhat box-like, but very woolly, the upper branches smooth. Like *E. Banksii,* this might be termed a Woollybutt.

E. melliodora A. Cunn.

One of the most beautiful of our medium-sized or larger trees, because of the density and grace of its pendulous foliage. Its trunk is usually somewhat crooked or forks early, the bark is sub-fibrous or box-like (often somewhat ragged), varying in texture and in the height to which it extends. As a rule it covers the trunk and thicker branches. The cast of the bark is yellow; the colour of the inner bark bright yellow.

E. nitens Maiden.

A fine large Gum up to 150 feet, with a symmetrical barrel of 3 or 4 feet diameter. Rough bark about one-third of the way up, and then peeling into ribbons.

E. NORMANTONENSIS Maiden and Cambage.

Small Box-trees of 10–30 feet, sometimes suggestive of a Mallee. Box-bark on trunk and large branches. Upper branches sometimes smooth and greenish.

E. OVATA Labill.

Large trees, with rough butts, with flattish ribs of fibrous bark reminiscent of Turpentine (*Syncarpia laurifolia*). Branches smooth, but they are rough-barked trees on the whole.

E. PILLIGAENSIS Maiden.

A medium-sized tree, with whitish-grey bark and persistent, as in *E. hemiphloia*, on the trunk and main branches. Timber pale-brownish and interlocked. Known as "Narrow-leaved Box."

E. PRUINOSA Schau.

Silver-leaved Box. A medium-sized tree, with diameter of about a foot, bark persistent, grey, thin and fibrous. A tropical species.

E. QUADRANGULATA Deane and Maiden.

A tree of 80–100 feet and diameter of 2–4 feet. Very much resembles the ordinary Box (*hemiphloia*) in general appearance, but bark more fuzzy and less soft than the latter. The branches have smooth tips.

E. YARRAENSIS Maiden and Cambage.

A medium-sized tree with woolly bark on trunk and branches.

C. *With red or reddish-brown timbers :—*

E. bicolor A. Cunn.
E. Brownii Maiden and Cambage.
E. Cambageana Maiden.
E. polyanthemos Schauer.
E. microtheca, F. v. M.

These five timbers are put in their present place because of their red or reddish-brown colour. They all seem to be rightly placed in the Hemiphloiæ, but additional experience may show that they may be fitly placed in another Group.

E. BICOLOR A. Cunn.

A large tree with pendulous branches, which are more or less smooth. Bark dark coloured, very thick, and even furrowed like an Ironbark when old, though not so hard, flaky-fibrous, sometimes even reminiscent of a Stringybark. "Close and even, resembling a typical Grey Box in younger trees." Timber red, rarely reddish-brown.

E. BROWNII Maiden and Cambage.

A medium-sized Box-tree, about 40 feet high, erect rather than drooping, with hard, thin flaky Box-bark on the trunk and large branches, the ultimate branchlets smooth. Timber dark red in colour.

E. Cambageana Maiden.

A medium-sized tree, up to from 50 to 80 feet high, with long pendulous branches. Bark scaly up to 3 or 4 feet from the ground, hard and dark-coloured, hence the name "Blackbutt." The remainder of the stem and branches are smooth and white. Timber deep red or chocolate, said to resemble that of Red Box (*E. polyanthemos*).

E. polyanthemos Schauer.

"Red Box" par excellence. Usually a medium-sized, scrambling tree, the amount of "boxy" or scaly bark on the trunk varying. (See Part XLII, p. 58).

E. microtheca F.v.M.

The description of no Eucalyptus bark has given me more trouble than this species.

The description of the original species says: "With a dirty brownish-white bark full of wrinkles and cracks, persistent on the trunk, deciduous on the upper branches, *leaving them ashy white.*"

Bentham (B.Fl. iii, 223, 1866), in the well-known confusion with *E. brachypoda* Turcz., referred to in Part XI, p. 51, of the present work, says:—

> A tall shrub or small or moderate sized tree, the bark varying from smooth and whitish to dark and rugged, persistent or shed in large patches (Oldfield), dark and rough on the trunk, smooth, whitish and deciduous on the branches (F. Mueller).

Mr. R. H. Cambage, in *Journ. Roy. Soc. N.S.W.*, xlix, 433 (1915), refers to the uncertainty in regard to the bark at some length. He rightly points out that the Bourke (N.S.W.) tree has "smooth, perfectly white branches" and "brownish-red" timber. The Gulf of Carpentaria tree is entirely covered with Box bark, but there are some intermediate forms going northward from Bourke. The Gulf Coolabah has timber of a shade darker than that of the Bourke tree.

I have referred to the subject in Part XI, p. 53, of the present work, and also in my "Forest Flora of New South Wales," Part LI, p. 20.

> Mr. W. V. Fitzgerald (MSS.) speaks of the Kimberley (North-west Australia) tree as "30–50 feet, trunk to 25 feet, diameter 1–2 feet, branches often pendulous, bark persistent on stem and branches, dark gray, rather thick, rough and longitudinally fissured, often of a fibrous texture, timber red, hard and tough." This could also be taken as a description of the tree as we usually find it in eastern Australia, but we have on the Murchison River (limestone and vicinity of fresh water) and also in tropical coastal Western Australia, an undoubted white gum with a white-washed bark. The environments which have brought about these changes have not yet been explained. Perhaps we have a second species. (Maiden in *Journ. Roy. Soc., N.S.W.*, LI, 153 (1917).

Summarising, I think the position of the species is something like this:—

A tree of medium or large size (up to 70 or 80 feet, with a diameter of 4 feet), but generally much smaller, often more or less crooked, branches pendulous, and the trunk, to a varying height, covered with a sub-fibrous, shaggy bark, to scaly or flaky bark, the branches smooth and perfectly white. In tropical and sub-tropical Western Australia we have the extreme form of the whole of the trunk being smooth and white.

D. Western Australian Species.—This provisional group contains three tropical species, of whose bark and habit we are but imperfectly informed. When we know more about some of the members included in it, it will be revised. The timbers are all brown, or believed to be so.

- *E. argillacea* W. V. Fitzgerald.
- *E. cornuta* Labill.
- *E. foecunda* Schau.
- *E. gamophylla* F.v.M.
- *E. Guilfoylei* Maiden.
- *E. megacarpa* F.v.M.
- *E. occidentalis* Endl.
- *E. oligantha* Schau.

E. ARGILLACEA W. V. Fitzgerald.

A tree of 25–40 feet, 9–12 inches diameter. Bark dark grey, persistent on the trunk and semi-fibrous, approaching that of a Box. We know very little of this species; perhaps it would be better with the Western Australian Blackbutts, see p. 29.

E. CORNUTA Labill.

A tree of medium size, spreading, with rough, boxy, fibrous, dark bark, with vertical fissures close to each other, limbs ribbony and smooth. An old Yate resembles an Ironbark at the butt.

E. FOECUNDA Schau.

A tree of medium size, the trunk with rough bark up to the branches, which are usually spreading. It has black flaky to almost ribbony bark on trunk, smooth limbs. Sometimes when it is young it grows in clumps from one root, thus showing affinity to the Marlocks.

E. GAMOPHYLLA F.v.M.

A glaucous shrub or small tree, widths of timber not exceeding 8 inches being available. Notes on the bark are not available to me.

E. GUILFOYLEI Maiden.

A tall tree, with fibrous or stringy bark to within a few feet of the branches. It seems to resemble *E. acmenioides* of the eastern States a good deal.

E. MEGACARPA F.v.M.

This is locally known as "Blue Gum" in South-Western Australia. It is a gouty, useless timber tree, which may exceptionally attain a diameter of 3 feet. The bark is like a White Gum, or perhaps like a Grey Gum (*E. punctata*, eastern New South Wales) to some extent; that is to say, white and smooth, with patches of bark of sand-paper-like texture, which peel off and present a smooth surface, which, in its turn, roughens and exfoliates. Bark rather thick, wood not hard, with large gum-veins, and becoming brownish towards the heart.

E. OCCIDENTALIS Endl.

This species, like some others, is variable alike in height and bark. It may be :—

(1) An erect, small, or large tree with flat top, hence the name "Flat Top Yate," the bark blackish and furrowed (on lower half of the trunk), then flaky or feathery, with black twisted strips, like a French fowl, for approximately the remaining half, then with smooth branches. Timber brown.

(2) The Mallets, which are smooth-barked trees of medium size, and the bark of some of them is used for tanning.

E. OLIGANTHA Schau.

A tropical tree about 40 feet in height, with a trunk up to 15 feet, and diameter of 1 foot: bark greyish, thin and smooth.

3. RHYTIPHLOIÆ (Rough Barks).

These are rough barked all over, that is to say, not half-barked, like the Hemiphloiæ.

In Mueller's original definition (1859) he included Bloodwood trees, Box trees (in part), Peppermint trees (in part).

In the "Eucalyptographia," as I have already shown in Part I., he introduced a number of species which are still recognised as Rhytiphloiæ, but includes the Hemiphloiæ (which he abolishes as such), together with one member of the Leiophloiæ (*E. stellulata*), one a South Australian Peppermint (*E. odorata*), not an eastern one, and large numbers of the Bloodwoods. Indeed his classification of 1884 is very much worse than that of 1859; it is retrograde.

In his original group, if Mueller had not cited some examples, it would not have had to be so much modified now. But his group is still useful (without his examples). He defined it as: "With wrinkled persistent bark, rather solid." It may be defined as: With certain rough barks, which extend to the tips of the branches, or very close thereto, and not half-way in the case of the Hemiphloiæ, and not absent in the case of the Leiophloiæ.

The Bloodwood trees must be excluded, as they come better in Section 6—Lepidophloiæ. Most of the Peppermints (but not all of them) must be excluded too, and it must be remembered that over sixty years ago we knew less of the Peppermints than we do now.

It includes a number of trees which the bushmen give separate names to, but, even in the present state of our knowledge, the Rhytiphloiæ is the least satisfactory of Mueller's six groups.

In considering the Rhytiphloiæ, it is worth emphasising that it is intended to include trees (not otherwise disposed of in the almost natural rough-barked groups of Stringybarks, Ironbarks, and Bloodwoods), which have rough bark to the ends of the branches, in contradistinction to the Hemiphloiæ. I think it will be found a useful broad group, as the time goes on, but, as in all groups, the difficulties start with what shall be included in it, and how it shall be subdivided. When we know more of the trees of our own country, these difficulties will largely disappear.

a. With Pale Timbers:—

E. acaciæformis Deane and Maiden.
E. angophoroides R. T. Baker.
E. Baueriana Schauer.
E. Cloeziana F.v.M.
E. conica Deane and Maiden.
E. decipiens Endl.
E. elæophora F.v.M.
E. gomphocephala DC.
E. microcorys F.v.M.
E. Mundijongensis Maiden.
E. notabilis Maiden.
E. nova-anglica Deane and Maiden.
E. odorata Behr, and Schlecht.
E. patens Benth.
E. Planchoniana F.v.M.
E. populifolia Hook.
E. rariflora F. M. Bailey.
E. Raveretiana F.v.M.
E. rudis Endl.
E. striaticalyx W. V. Fitzgerald.
E. Stuartiana F.v.M.
E. Todtiana F.v.M.
E. torquata J. G. Luehmann.

E. ACACIÆFORMIS Deane and Maiden.

Bark dark, hence the name "Black Peppermint;" fibrous, and sometimes so rough and furrowed as to resemble an Ironbark at a little distance.

E. ANGOPHOROIDES R. T. Baker.

A medium-sized tree with a white box bark, persistent to the ultimate branches.

E. BAUERIANA Schauer.

A tree of medium or large size, with a rounded head of dense foliage when in full vigour. Rough greyish or dark soft bark on the trunk and ultimate branchlets.

E. CLOEZIANA F.v.M.

"Messmate." A tall tree, the bark flaky-fibrous and furrowed. Its bark has been described as brown, deeply furrowed, flaky, resembling that of *E. siderophloia*, but, of course, not hard. Pale-coloured, drying yellowish-brown.

E. conica Deane and Maiden.

A tree of medium size, say 40–60 feet, with a fuzzy bark almost to the tips of the limbs, but the covering of the rough bark varies in amount. Timber pale brown.

E. decipiens Endl.

A "Swamp" or "Flooded Gum." The Fremantle tree (the type), attaining 30–50 feet, but usually much less, the branches spreading or almost pendulous, and very much like *E. gomphocephala* DC. in appearance. Bark thick, persistent and rough, of an ash-grey colour, the bark of the upper portions sometimes smooth.

The southern form varies from a shrub to a small or large tree, but on the banks of creeks or rivers it attains the height of 60–70 feet, with a diameter of 3 feet, but is never an erect tree. The bark is fuzzy-fibrous, the outer layers softish, flaky and furrowed, very much like that of *E. Stuartiana.*

E. elæophora F.v.M.

A medium or large tree. A Box, the rough bark as that of an Ironbark in old trees. Persistent rugose bark, dirty ash-grey.

Rough scaly bark, persistent on stem and branches is another description.

E. gomphocephala DC.

The bark is sub-fibrous (matted), reminding one of the "Box" trees (Hemiphloiæ) of eastern Australia, except that the branches are not smooth, and therefore have no ribbons. The superficial resemblance is perhaps closer to *E. Stuartiana*, the Apple-tree of eastern Australia.

E. microcorys F.v.M.

Bark fibrous, flat-furrowed, reminding one of a Turpentine (*Syncarpia laurifolia*), or a Jarrah (*Eucalyptus marginata*), but paler. It can be further described as sub-fibrous, of loose and even woolly texture. In colour it is of a sort of brick or rusty red, and is persistent even to the smallest branches. It is often of a corrugated apppearance, particularly in old trees.

E. Mundijongensis Maiden.

A tall tree of 80–100 feet, 5 feet in diameter. Fine adherent bark at base, top clean. Hard flaky, breaking off in long woody strips. Bark of smaller branches smooth. It is reminiscent of *E. gomphocephala*, the Tuart.

E. notabilis Maiden.

A tree of medium size, with dark umbrageous foliage. Bark flaky-stringy or fibrous-flaky in young trees. It is rough to the tips of the branches. Timber pale-coloured, of the palest brown when freshly cut, fissile.

E. nova-anglica Deane and Maiden.

A tree of medium size, much branched. It is a Peppermint with rough bark, fibrous to scaly or flaky, branches smooth.

E. ODORATA Behr.

Dark grey, rough, persistent bark. Fairly large tree, trunk 18 inches in diameter. Bark black, scaly or rough, hard, furrowed in the case of the largest trees. Branches smooth or nearly so. Timber pale-coloured to brown, and hard.

E. PATENS Benth.

A large tree, with rough bark all over the trunk and branches. Said bark is soft rather than hard, thick, greyish, black. In Western Australia such a bark is called Blackbutt. In eastern Australia it would be called a Woollybutt.

E. PLANCHONIANA F.v.M.

A tree attaining a height of 100 feet. Although sometimes termed Stringybark, the bark is short-grained and cannot be used for roofing purposes, hence it is called Messmate. It is rough to the branchlets. It has a flat-fibrous bark, somewhat resembling that of *E. resinifera*. It has also been compared with that of *E. robusta*. The timber is pale-coloured and is sent to market sometimes as a substitute for Tallow-wood (*E. microcorys*).

E. POPULIFOLIA Hook.

"Bimble Box." A small to medium-sized, sometimes umbrageous, tree, often rather erect in habit, but with more or less pendulous branches. Bark sub-fibrous and somewhat matted (box-like); persistent on both trunk and branches. Timber pale brown.

E. RARIFLORA F. M. Bailey.

A tall tree, the trunk and large branches covered with hard-fibrous, black, corrugated bark such as would merit the name of Black Box. Timber pale brown.

E. RAVERETIANA F.v.M.

A "Box." A large and sturdy tree, somewhat scrambling in habit. It has flaky or hard scaly bark on the trunk or main branches. The flakes or furrows are not deep. The smaller branches are dirty blue-grey in colour. Timber brownish.

E. RUDIS Endl.

Bark darkish grey, not deciduous like *E. rostrata*; corky and thin flaky, *i.e.*, the rough bark, which is flattish and not thick, is so much fissured, both longitudinally and transversely, that it breaks into small flakes with but slight violence.

E. STRIATICALYX W. V. Fitzgerald.

Tree of 30–40 feet. Bark dark grey or blackish, flaky, thin, yellow inside, covering the whole of the trunk and part of the branches. Perhaps a Black Box. Timber pale brown.

This is unquestionably allied to *E. dumosa*, placed with the Mallees.

E. STUARTIANA F.v.M.

A large, often scrambling tree, with soft, white (often superficially discoloured) box-like bark, rough to the extremity of the branchlets. Bark thickish, often zig-zagged or wrinkled, and reminding one of the shorn back of a sheep.

E. Todtiana F.v.M.

A Woollybutt. A medium-sized, spreading or scrambling tree, attaining a stem-diameter of 3 feet. Bark sub-fibrous, extending to the branchlets.

E. torquata J. G. Luehmann.

Trees of 20–30 feet, with trunks of usually 4-10 feet to first branches. Bark rough, flaky, dark coloured on the butt, the branches smooth. Timber undescribed.

(*b*) *With red timbers*:—

These red timbers include the Mahoganies, and Mahoganies prefixed by other adjectives. *E. marginata* (Jarrah) is often known by old hands as Mahogany. The Mahoganies are, as regards their barks, in some respects intermediate between the Stringybarks (Pachyphloiæ) and the Bloodwoods (Lepidophloiæ). *E. longifolia* is known as Woollybutt. Tentatively I place here *E. longicornis*.

All these species (with the possible exception of *E. longicornis*) are confined to coastal areas, or at all events to districts not very far inland.

E. botryoides Sm.
E. exserta F.v.M.
E. Jacksoni Maiden.
E. Kirtoniana F.v.M.
E leptophleba F.v.M.
E. longicornis F.v.M.
E. longifolia Link and Otto.
E. marginata Sm.
E. patellaris F.v.M.
E. pellita F.v.M.
E. resinifera Sm.
E. robusta Sm.
E. Rudderi Maiden.

E. botryoides Sm.

Beautifully umbrageous, varies as to the extent of persistency of the rough bark, whether it extends to the ultimate branchlets or not. Bark thick, softish, sometimes called Woollybutt, but usually Bastard Mahogany. A description of the Gippsland trees, where they attain fine development, is—"Bark dark, rough scaly, and persistent on the stems and main branches, smooth on the smaller branches, the outer bark on these peeling off in thin flakes."

E. exserta F.v.M.

A medium-sized tree, with rough bark, not a typical Peppermint, rather more scaly, yet not scaly enough to be a Bloodwood. In the fruit, very closely allied to *E. rostrata* and *E. tereticornis*.

E. JACKSONI Maiden.

"Red Tingle Tingle." A noble forest tree up to 200 feet high with a long trunk which attains a diameter of 15 feet. Bark fibrous, reddish, thick, of a stringybark character, but somewhat brittle, covering the trunk and branches. Timber rich red, reminding some of *E. resinifera*.

E. KIRTONIANA F.v.M.

A medium-sized tree, with furrowed, fibrous bark or described as a Stringybark, resembling that of *E. resinifera*.

E. LEPTOPHLEBA F.v.M.

A large tree, bark of a dirty grey, rugose, fissured on the trunk and persistent on the branches. It is known in North Queensland as Blackbutt. It is a flaky-barked Box, the rough bark extending to the branchlets. Timber reddish-brown.

E. LONGICORNIS F.v.M.

"It is a magnificent tree, and, unlike the other allies of *E. oleosa*, it carries its rough bark right up to the base of the crown." (C. E. Lane-Poole sending a photograph from Westonia State Forest.) Timber red and exceptionally tough.

Mueller originally described it with "a rugose, ash-coloured bark (Rhytiphloiæ) on the trunk, persistent on the branches."

E. LONGIFOLIA Link and Otto.

A handsome, large tree. Bark of a dirty grey, brittle, fibrous character, and when thick thought to be of a woolly texture, hence the name Woollybutt. It often resembles box bark a good deal. Sometimes the bark on the branches is deciduous, when it is known as Peppermint.

E. MARGINATA Sm.

Bark rough, persistent, fissured-flat. In bark it gave me the impression somewhat of *E. resinifera* of the eastern States, or, perhaps of the Turpentine (*Syncarpia laurifolia*).

The above was written by me standing in front of characteristic trees. At the same time, while noting there were local differences (as is common in most Eucalypts), I could not understand the following official statement by Mr. Simpson of Bunbury :—

> VARIETIES OF JARRAH.
>
> There are three distinct varieties. A botanist might not be willing to admit that this is the case, but the practical sawyer of large experience recognises the difference between these varieties at a glance.
>
> The *Salmon-bark*, as its name indicates, is mottled like the king of fish. The wood is straw-coloured (!), close in the grain, and freer from gum-veins than Jarrah usually is. The smooth straight trunk rises from 30 to 40 feet before branching out, the crown being formed by three or four limbs spreading out nearly opposite each other. This kind yields by far the best wood for planking, and bends readily in almost any way that may be required. I have seen a board of this kind of Jarrah 7 in. x 1 in. and 30 feet in length bent into a complete circle, without the slightest sign of breakage.
>
> For ships' planking or in any position where tenacity is required, that is by far the best kind of Jarrah. It is, however, less plentiful than other varieties.

Another kind is usually called *Plum-pudding wood* by the sawyers, from its mottled appearance when cut into scantlings. This peculiarity extends nearly all the length of the trunk, but becomes less noticeable towards the crown end of the log. Black stripes radiate star-like from the centre; these get gradually fainter as they approach the outside of the log, but are clearly defined and very uniform in the centre. Some trees of this class make handsome furniture, but their timber is generally too dark coloured. This variety is much more free to work than either of the other.

The *Rough-Bark* is another kind, its bark is very coarse, and twice as thick at least as that of the *Salmon-Bark*. The wood is dark. The seed pod, leaves and habits of all Jarrah trees are alike. (Government of Western Australia, "General Information respecting the present condition of the Forests and Timber Trade," 1882, pp. 10–11).

In asking the kind attention of Mr. C. E. Lane-Poole, Conservator of Forests of Western Australia, to the puzzle, I suggested that perhaps in the reference to the "Salmon-bark" there might be some confusion with *E. salmonophloia*. Mr. Lane-Poole replies:—

I, of course, only recognise one Jarrah; at the same time, there is no question that there is a certain difference in the bark of certain Jarrahs. The salmon-bark Jarrah is quite recognisable, and it appears to me to be a case of deciduous bark. I have examined a great number of the trees, and in all cases the bark has peeled off naturally, leaving the bright clean bark underneath, hence the name, "Salmon Bark." I have not yet been able to find out whether the tree casts its bark regularly or periodically. The bushman tells me it does it once a year.

In regard to "Plum-pudding" wood, I have never heard the term, but I know exactly what he means. I prefer this type of wood to any other for furniture making, but I do not think that it comes from a different variety of tree, but merely that the tree is very old and the wood is, if anything, over-mature.

I have sent the extract down to my Chief Timber Inspector, who is a man of very wide knowledge of our timbers, and I hope to get some more satisfactory information from him for you.

The Chief Timber Inspector's report is as follows:—

I think there are two kinds of Jarrah trees, viz., Salmon and common.

Salmon Trees vary according to soils and drainage. When growing on coastal sand-hills the wood is generally interlocked, the crown well branched and healthy, but too heavy in proportion to the trunk; the wood is fairly clear of gum-veins; the tree is not high.

When growing on the western top of the Darling Range, say 3 miles east of Keysbrook, in semi-sand and gravel soil, amongst Table-top or hill Banksia, the trees are of medium height with nice healthy trunks and crowns, exactly as described by Mr. Simpson. They are subject to bendy heart, the same as common Jarrah, in fact, I think more so. 6 in. to 12 in. deep of the sap side wood is a pretty red. The inner wood is straw-coloured (?). The inner and outer wood is practically clear of gum-veins or gum-pockets. The bark and wood are long fibred.

As you travel eastward into the forest the bark becomes thicker and rougher, especially in fair soil, the trunk is longer, the crown smaller, and the wood a little less clear of gum, especially towards the crown, and it becomes very difficult, except on true Salmon Jarrah soil, to distinguish the tree from the common Jarrah. Salmon Jarrah is generally associated with Banksia and very little Redgum (Marri) (*E. calophylla*).

Plum-pudding Wood.—This wood occurs in both kinds of Jarrah, caused, in my opinion, by senile or natural decay.

Mottled Wood.—This occurs in both kinds of Jarrah, and is caused, in my opinion, by two reasons, first ¾ inch navel-like folding growths; second, senile decay of less duration than in the Plum-pudding wood. Both woods are useful for furniture and mouldings, piano and skirting boards, but very little good for sleepers.

Generally speaking, both the common Jarrah tree and the Salmon Jarrah trees, prior to the plum-pudding stage, are tougher and harder inside than outside; they are also tougher towards the crown than they are at the butt, and contain more gum-veins and faults, such as more knots between the crown.

Sometimes both kinds of trees have the following kinds of winds—

Right-hand 1 in. to full radius; left-hand the same. The trunk is sometimes windy inside and straight-grained outside, and the opposite, as mentioned above. (H. McCoy, Bunbury.)

E. PATELLARIS F.v.M.

"A fairly tall tree, like *E. microtheca* in habit. Bark dirty grey, wrinkled and cracked, persistent on the trunk and branches." A tropical species, not seen since the type was collected. We know nothing of its timber.

E. PELLITA F.v.M.

A tree of 40–50 feet, with a rough dark-grey bark (Dallachy).

"Branches smooth." "Glabrous tree." "Woolly bark." "Fibrous bark." "Mahogany." "Short, stringy bark."

E. RESINIFERA Sm.

"Forest Mahogany." A large tree, the bark rough and persistent, very rough on the old trees, running right out on to the smaller branches.

E. ROBUSTA Sm.

"Swamp Mahogany." A moderate sized tree, bark in furrows, brownish, sub-fibrous, almost soft, scaly.

E. RUDDERI Maiden.

A tall tree, attaining a height of over 100 feet. The bark persistent, and like that of *E. hemiphloia*, but, unlike that tree, extending up to the small branches.

4. PACHYPHLOIÆ (Stringybarks).

This is one of the most natural of Mueller's groups, but even it may be variously interpreted. With the genuine Stringybarks are sometimes included *E. resinifera*, particularly in South Queensland, but the fibre is shorter than that of the true Stringybarks. In some States *E. obliqua* is, for the same reason, called Messmate in some districts, rather than Stringybark, the meaning of the word being that it is associated with, or rather reminiscent of, the true Stringybarks. These are included in barks which do not peel off, as do the Gums and half-barks, but which make provision for the expansion of the stem through growth in another way. Thus the Stringybarks and the Ironbarks belong to this category, and we have but little to say in regard to them.

In 1859 Mueller simply defined the Pachyphloiæ as "Stringybarks." In 1884, as we have seen (Part I, p. 312), he called the Group Inophloiæ (in which nobody ever followed him), and included in it the ordinary Stringybarks, as well as others which, had his field-memories not failed him, he would certainly not have placed with those trees. In the Pachyphloiæ, in 1884, he had only one species, rather an absurd arrangement, viz., *E. ptychocarpa*, which I have placed in the Lepidophloiæ.

The timbers vary from almost white to pale reddish brown, but never become a real red.

I place the following in the Pachyphloiæ :—

E. acmenioides Schauer.
E. Blaxlandi Maiden and Cambage.
E. capitellata Sm.
E. eugenioides Sieb.
E. lævopinea R. T. Baker.
E. macrorrhyncha F.v.M.
E. Muelleriana Howitt.
E. obliqua L'Herit.
E. umbra R. T. Baker.

As a sub-section we have :—

a. Mallee-like or dwarf forms, comprising :—

E. alpina Lindl.
E. Camfieldi Maiden.
E. ligustrina DC.

Small as these species are, they have flattish, thin barks, which can be at once seen to be Stringybarks.

E. ACMENIOIDES Schauer.

"White Mahogany." A tall, erect tree, with fibrous bark, thinner than that of a Stringybark—between that and a Peppermint, but, on the whole, belonging to the former.

E. BLAXLANDI Maiden and Cambage.

A medium-sized tree. A typical Stringybark. This and the following four species are very closely related.

E. CAPITELLATA Sm.

A medium-sized tree, a typical Stringybark.

E. EUGENIOIDES Sieb.

A medium-sized tree, a typical Stringybark.

E. LÆVOPINEA R. T. Baker.

A medium-sized tree, with sub-glaucous foliage, which gives it the name of "Silver-topped Stringybark."

E. MACRORRHYNCHA F.v.M.

A rather tall, typical Stringybark, with exceptionally slender, pendulous branchlets.

E. MUELLERIANA Howitt.

A Stringybark of rather large size. Bark often yellow, particularly the inner bark.

E. OBLIQUA L'Herit.

A medium-sized tree, much disposed to lateral branching, particularly in Tasmania, where the type comes from. It is rough-barked to the ends of the branches, the bark of the trunk and branches is decidedly fibrous, but the fibres are not so clean and tenacious as those of the true Stringybarks, and the bark is not so suitable for roofing. It and *E. Muelleriana* are more closely related to each other than to the others.

E. UMBRA R. T. Baker.

"Stringybark." This Stringybark is closely related to *E. acmenioides*, and both are known as White Mahogany (in contradistinction to *E. resinifera*, the Red Mahogany, with red timber).

Mallee-like or dwarf species:—

E. ALPINA Lindl.

This local species is allied to the Stringybarks, and Mr. A. J. Campbell says that local residents in the Grampians look upon it as a dwarf Stringybark.

Under cultivation in the Centennial Park it attained the height of about 20 feet, with gnarled, spreading branches, and the trunk and branches covered with soft, stringy bark.

E. CAMFIELDI Maiden.

A low branching shrub or stunted tree, almost Mallee-like, and under 12 feet in height. Bark scaly-fibrous or fibrous, flattish, tough—a Stringybark.

E. LIGUSTRINA DC.

A small species, with rather flat, stringy bark, usually forming Mallee-like clumps from 3–12 feet high; when solitary may attain a height of 15 feet.

5. SCHIZOPHLOIÆ (Ironbarks).

This is a classification of 1859, but, as usual, as regards the classification, Mueller did not improve on it in the "Eucalyptographia" in 1884, by means of his examples. On that occasion he only included three true Ironbarks, viz., *crebra*, *siderophloia* and *melanophloia*. We have already seen that he omitted the two most characteristic ones, viz., *paniculata* and *sideroxylon*, because he thought that they included smooth-barked species (*fasciculosa* and *leucoxylon*).

We must beware of false Ironbarks. For example, *E. stellulata* and *E. cornuta* may often be seen with a large amount of dark-coloured, indurated bark on the trunk. The so-called Ironbark of Tasmania (*E. Sieberiana*) native also of eastern Victoria and New South Wales, has a furrowed bark remarkably like Ironbark at a little distance, but much softer than that of the true Ironbark. Mueller, however, looked upon *E. Sieberiana* as an Ironbark in 1884, and even included *E. Cloeziana* and a couple of Bloodwoods (*E. ficifolia* and *E. calophylla*).

Following is an early note on Ironbarks :—

> Every being renews its epidermis (or the appendages thereof) occasionally, either periodically and all at once—as snakes—or more gradually—as in the moulting of birds and other animals—while in the case of some animals with naked skins, this process is in continual operation, scales being constantly thrown off. Among vegetables also, we find analogous processes; in some cases—dependent on the renewal of the composing members and the death of others—the bark is shed gradually, that is, the outer portion slowly decays, so that its thickness remains nearly invariable; but in other instances, and dependent upon the same conditions, the whole bark is shed annually and almost simultaneously, as in many Eucalypti, some of which, however, come under the former category, though in some species the process proceeds so slowly that the bark acquires an immense thickness, as in *E. sideroxylon*, a condition probably due to the vast amount of antiseptic gum which pervades it. To meet this order of things, the bark being sometimes 15 inches in thickness, the bark cracks longitudinally, so that the trunk is marked by raised ridges and intervening deep grooves, which proceed in an interruptedly spiral manner from the ground to the head of the tree. (MSS. of Augustus Oldfield, circa 1864, pp. 452–3).

Ironbarks have corrugated, indurated barks, either grey or black externally. They include *E. paniculata* (White or Grey Ironbark), with pale-coloured timber, and the commonest Ironbark about Sydney. *E. siderophloia* (Broad-leaved Ironbark) with coarse foliage, found in the western suburbs and further afield, especially on the Northern Rivers, and also in western New South Wales, a glaucous form. *E. crebra* (Narrow-leaved Ironbark), has pendulous foliage and is widely diffused over New South Wales. Both this and the preceding one are known as Red Ironbarks from the colour of their timber. *E. melanophloia* (Silver-leaved Ironbark) is a somewhat straggly tree, found chiefly in the north-west of New South Wales, in regions of low rainfall; it does not occur near Sydney. *E. sideroxylon* is found in the Sydney district to the south, sparingly, but chiefly on the western slopes of the State. There are other species, of less importance. The Ironbarks attain their greatest development in New South Wales, but three which do not occur in that State are endemic to Queensland.

Following are the Ironbarks :—

E. Beyeri R. T. Baker.
E. Caleyi Maiden.
E. crebra F.v.M.
E. Culleni Cambage.
E. decorticans Bailey.
E. drepanophylla F.v.M.
E. melanophloia F.v.M.
E. paniculata Sm.
E. siderophloia Benth.
E. sideroxylon A. Cunn.
E. Staigeriana F.v.M.

E. BEYERI R. T. Baker.

A typical Ironbark found, as far as we know, in a limited area a few miles west of Sydney. Bark hard, heavy, very thick, permeated with kino.

E. Caleyi Maiden.

A tall tree, often glaucous, and finally becoming glabrous, but remaining dull-coloured. Called "Broad-leaved Ironbark" in comparison with narrower-leaved Ironbarks (*E. sideroxylon* and *E. crebra*) and sometimes "Drooping Ironbark," a character it possesses in common with *E. crebra*.

E. CREBRA F.v.M.

A tall tree, with drooping branches. Very deeply furrowed, in depth only (if at all) inferior in that respect to *E. sideroxylon*. Timber red.

E. CULLENI Cambage.

Bark hard, rough, furrowed. A Queensland species. Timber red.

E. DECORTICANS Bailey.

"Naked-top Ironbark" or "Gum Top." This is remarkable because of its deciduous branches. Bark on the butt with flattish ridges reminiscent of *E. siderophloia*.

E. DREPANOPHYLLA F.v.M.

A typical Ironbark, long confused with a Box (*E. leptophleba*).

E. MELANOPHLOIA F.v.M.

An Ironbark, inferior for economic purposes, which often goes under the name of Silver-leaved.

E. PANICULATA Sm.

An erect tree, Pale or Grey Ironbark, the king of all Ironbarks, because it possesses all the best characteristics of typical Ironbark timber, viz., strength, durability, weight. Bark often pale-coloured, even grey. Furrows often anastomosing.

E. SIDEROPHLOIA Benth.

The ridges the flattest of those of any Ironbark. Examination of the photo of the trunk from Wyong, New South Wales, in Part XXXIX of my "Forest Flora of New South Wales," shows that the bark of this species may be not furrowed, but flaky. Usually, however, it is an indubitable Ironbark.

E. SIDEROXYLON A. Cunn.

A small, medium-sized, or even tall tree, often gnarled. Dark, the deepest furrowed of the Ironbarks. It often occurs on the Goldfields of New South Wales and Victoria. "Mugga."

E. STAIGERIANA F.v.M.

A medium-sized tree, with glaucous, lemon-scented foliage, from which a perfume oil is distilled. It is, however, rather a scarce species.

Let us now consider the *Ironbark-Boxes*.

These are intermediate species connecting the Ironbarks with the Boxes.

The present seems a natural place to put them in. They have something of the Ironbark character and the Ironbarks readily cross with the Boxes. The subject will be further pursued under Hybridisation in Part LIII, where, amongst other crosses, are some striking ones between these two groups of Eucalypts.

E. AFFINIS Deane and Maiden.

"Ironbark Box." A tree of moderate size, attaining a height of 80 feet and a diameter of 2 ft. 6 in.

In appearance it looks half Ironbark and half Box, and has strong affinities to both. Often the butt in old trees is nearly as rough as that of *E. sideroxylon*, but seldom quite, while the upper part resembles *E. hemiphloia* var. *albens*, but in general it has a dark brown, fairly rough bark an inch thick. The bark is thinner and softer than that of *E. sideroxylon*, but harder and thicker than that of *E. hemiphloia* var. *albens*.

E. BOORMANI Deane and Maiden.

"Black Box." A large tree, a good deal similar in general appearance to *E. siderophloia*. The bark dark in colour, often very dark grey and even black. In texture scaly, sometimes hard-scaly, and even in parts nearly as rugged as an Ironbark, but never so soft as a Box. The rough bark extends to the small branches. It possesses characters intermediate between *E. siderophloia* and *E. hemiphloia*.

E. HYBRIDA Maiden.

"Ironbark Box." An erect tree of about 50 feet, the tips of the branches smooth, the butt with a sub-fibrous (Peppermint-like) or flaky-fibrous, or more or less flat-corrugated bark—indeed, between the Boxes and the Ironbarks. Evidence is adduced to show that the two species which probably cross to form this interesting species are *E. paniculata* and *E. hemiphloia*. Timber pale coloured, hard, interlocked.

6. LEPIDOPHLOIÆ (Barks friable and lamellar).

Mueller, in 1859, defined this group as lamellar, friable and persistent on the trunk. He quoted as examples "Melaleuca Gum trees, Mica trees." These are really *E. miniata* and *E. phœnicea*. I did not at first understand the meaning of this kind of bark, but subsequently explained it under Part XXII, p. 37. The type is a very brittle bark, with a large number of layers.

In his 1884 classification he let his two 1859 species remain, and added *E. peltata*, a Queensland Bloodwood or Yellow-jacket.

I think that the Lepidophloiæ should have transferred to it the "Bloodwood trees" from the Rhytiphloiæ. This will render both sections more natural. I think the Lepidophloiæ might be termed "Flaky barks," but one must be careful not to confuse them with barks which are Gums, and which have part of the butt covered with hardish flakes which are not in comparatively regular scaly pieces.

They may be divided into two groups:—

(*a*) Dark barked, and with red timber.

(*b*) Yellow-jackets and other pale barks, with pale timber.

In considering (*a*) it is to be borne in mind that, as the tropics are reached, the colour of the Bloodwood bark gets toned down or lighter, so that we may have the term "whitish" applied to such.

(*c*) *E. calophylla* and *E. ficifolia* are provisionally put into a separate group; they have pale timbers, but the barks are nearer those of (*a*).

a. Dark barks and with red timber:—

E. Abergiana F.v.M.
E. Cliftoniana W. V. Fitzgerald.
E. corymbosa Sm.
E. dichromophloia F.v.M.
E. ferruginea Schau.
E. Foelschiana F.v.M.
E. hæmatoxylon Maiden.
E. Hilliana Maiden.
E. latifolia F.v.M.
E. perfoliata R.Br.
E. ptychocarpa F.v.M.
E. pyrophora Benth.
E. setosa Schau.
E. terminalis F.v.M.

E. ABERGIANA F.v.M.

A tree whose height is not certainly known, with rough bark, probably of the usual flaky character.

E. CLIFTONIANA W. V. Fitzgerald.

A tree up to 30 or 40 feet with a diameter of 1 foot. Bark persistent on the stem and branches, dark coloured, rough and longitudinally furrowed.

E. CORYMBOSA Sm.

This is the original Australian Bloodwood. Its bark is rough, both trunk and branches, with both longitudinal and transverse fissures forming flakes rather than tesseræ. The wood is red and fissures in it exude a reddish kino, which is so abundant that it often runs down the tree, and, when freshly exuded, gives it the appearance of a stream of blood.

E. DICHROMOPHLOIA F.v.M.

This is a Bloodwood, and therefore with a bark more or less scaly. Mueller gave the specific name because of the "top layer (presumably the outer layer) of the bark as smooth and sub-papyraceous, cinereous, slowly breaking away from the interior red portion." This perhaps indicates transition between the ordinary Bloodwood barks and the "micaceous" barks of *E. miniata* and *E. phœnicea*. It doubtless has a bark similar to the tropical or deciduous bark of *E. terminalis*.

E. FERRUGINEA Schau.

A medium-sized tree with a rough, dark grey bark persisting all over the trunk. In describing a synonym, Mueller says " the outer bark . . . separating in small pieces." My note is " *E. ferruginea* seems to connect with the Corymbosæ through *E. Torelliana*." I do not know the colour of the timber, but assume that it is red, like *E. setosa*.

E. FOELSCHIANA F.v.M.

Not a large tree, usually crooked, and large leaved. There is some confusion in regard to the barks of different trees, but they appear all to belong to the Corymbosæ, *i.e.*, flaky barks.

E. HÆMATOXYLON Maiden.

A small tree, attaining a height of 20 feet, with a trunk diameter of 18 inches. Much resembling *E. calophylla* in general appearance, but much smaller. Bark that of a typical Bloodwood.

E. HILLIANA Maiden.

A broad-leaved tree of medium size, the bark somewhat tesselated or soft-scaly, the branches smooth. Timber rich reddish-brown.

E. LATIFOLIA F.v.M.

A small or medium-sized tree with the ordinary friable Bloodwood bark. Timber pale red, but that probably refers to a young tree.

E. PERFOLIATA R.Br.

A small tree, attaining a height of 40 feet, and a diameter of 1 foot. Bark persistent on stem and branches, dark grey, rough, lamellar and longitudinally fissured.

E. PTYCHOCARPA F.v.M.

Bark like *E. terminalis* to topmost branches. Trunk 15 inches in diameter. Small tree, with spreading, somewhat stunted, growth.

E. PYROPHORA Benth.

A medium-sized Bloodwood, with more or less scaly bark, and often known as Desert Gum because of the interior localities it prefers, and because of the comparatively pale colour presented after the scaly portion has fallen. Timber reddish-brown.

E. SETOSA Schau.

A low, shapely, spreading tree of 30 to 40 feet, seemingly closely related to the Angophoras. Bark rough and somewhat scaly. Timber red.

E. TERMINALIS F.v.M.

A medium-sized tree with a scaly bark. In tropical areas the scales may be deciduous, giving the tree a pale-coloured and comparatively smooth appearance, so that it may go under the name " White-stemmed Gum tree." It would appear that the scales subsequently develop on such trees (Compare *E. dichromophloia* and *E. pyrophora*.

b. Yellow-jackets and other pale barks, with pale timber :—

E. eximia Schauer.
E. intermedia R. T. Baker.
E. lirata (W.V.F.) Maiden.
E. miniata A. Cunn.
E. peltata Benth.
E. phœnicea F.v.M.
E. similis Maiden.
E. trachyphloia F.v.M.
E. Watsoniana F.v.M.

E. EXIMIA Schauer.

A medium-sized tree, attaining a height of 50 feet and more, conspicuous by its dirty-yellow bark, variously described as Snuff-coloured and Rusty. It is pulverulent and soft-flaky, not as hard as that of *E. corymbosa.* Timber pale-brown, becoming darker towards the centre of the tree.

E. INTERMEDIA R. T. Baker.

A medium-sized tree, with a light-brown fibrous bark, which is more or less scaly. Timber pale-coloured in comparison with that of *E. corymbosa,* but has often some red in it. This seems an exceptional species.

E. LIRATA (W.V.F.) Maiden.

Height 30–40 feet, diameter 1–1½ feet. Bark rough and greyish, but soft and almost friable, persistent on trunk and limbs. Timber brown.

E. MINIATA A. Cunn.

A tree of 50–100 feet high, with a diameter up to 3 feet, bark greyish to reddish, woolly fibrous to lamellar, persistent on the lower half of the trunk and sometimes covering the whole of it; the limbs always white and smooth. This bark has been described in such detail at Part XXII, p. 37, that I must refer my readers to it.

E. PELTATA Benth.

A medium-sized tree, known as Yellow-Jack from the yellowish colour of its scaly bark, a little more flaky than that of *E. corymbosa.* The timber is pale towards the outside of the tree, but dark brown towards the centre of the tree.

E. PHŒNICEA F.v.M.

Bark resembling that of *E. miniata* a good deal, which see.

E. SIMILIS Maiden.

A tree of medium size; notes on bark and timber uncertain, but probably closely related to *E. peltata.*

E. TRACHYPHLOIA F.v.M.

A medium-sized or tall tree, attaining a height of 80 feet. Bark whitish or yellowish, flaky or flaky-fibrous. Timber pale-coloured, somewhat like that of Spotted Gum (*E. maculata*).

E. Watsoniana F.v.M.

A tree of medium size, only known from one locality. Bark of a dirty pale-yellow colour, thick, scaly-fibrous, in layers. Timber not dark-coloured.

c. Provisional Group, with dark scaly bark and pale timber :—

E. calophylla R.Br.
E. ficifolia F.v.M.

E. calophylla R.Br.

A very large, spreading, umbrageous tree. In bark and general appearance it resembles the Bloodwoods of eastern Australia. The timber is pale-coloured.

E. ficifolia F.v.M.

Small tree, up to 30 feet, usually, however, of much smaller size, forming impenetrable thickets. Bark scaly and of a dark-brown colour, the inner bark of a pale brown. This is probably an indication of transit towards the Pale Bloodwoods or Yellow-jackets.

I suggest the following subdivisions of Lepidophloiæ :—

d. Eudesmiæ (excluding the Marlocks) :—

E. Baileyana F.v.M.
E. tetrodonta F.v.M.

Later on, perhaps, the whole of the Eudesmiæ may be kept in a separate classification, as they have so much in common in other directions.

E. Baileyana F.v.M.

Bark hard, thick, rather interlocked. An inferior Stringybark.

"Bark dark, fibrous, and transversely interlocked, very hard."

Timber of a light grey colour when fresh, interlocked in grain. "Bastard Ironbark."

E. tetrodonta F.v.M.

Tree of 40–50 feet, with a diameter of 1–1½ feet, bark persistent on trunk and branches, greyish, fairly rough and very stringy, timber pale, fissile (reddish brown, R. H. Cambage). Known as Messmate or Stringybark in the tropics, and should be compared with Pachyphloiæ.

e. Tessellata :—

In this section, the scales or flakes of the true Bloodwoods are more defined and deciduous, tending to form tesseræ. But they do not cover the whole of the trunk only the lower portion. The trees, therefore, form a connecting link with the Hemiphloiæ. From another point of view they are a section of Leiophloiæ (Gums).

Following are the proposed species :—

E. grandifolia R.Br.
E. papuana F.v.M.
E. Spenceriana Maiden.
E. tessellaris F.v.M.
E. Torelliana F.v.M.

The above have affinities to the Angophoroideæ, with the exception of *E. Torelliana*, which is closer to the Corymbosæ, and especially to *E. maculata*. The timbers seem all to be brown or brownish.

This section seems to have bark-affinity with *E. rudis*, *E. gomphocephala*, *E. Hillii*, and perhaps others. Perhaps *E. papuana* connects with *E. alba* and *E. Raveretiana.*

E. GRANDIFOLIA R.Br.

A small tree, with the outer bark brown and deciduous, the inner whitish and very smooth (R.Br.).

That it is usually known as " Moreton Bay Ash " indicates that its bark resembles that of *E. tessellaris*. " Timber very inferior "—probably pale-coloured.

E. PAPUANA F.v.M.

A medium-sized tree, the largest ones being about 50 feet high and 1 foot in diameter in Northern Queensland (Dr. T. L. Bancroft). It is known as " Cabbage Gum." The bark is white or greyish, and there is no rough bark as in *E. tessellaris*. Mueller puts the species in the Leiophloiæ.

On the other hand, the North-west Australian tree is stated to have the rough bark " persistent and tessellated for a short distance up from the butt, and thence white and smooth, but oftener smooth and white almost to the ground." (Part XXXVII, p. 194.) This means, probably, that the species has exceptionally a little tessellated bark like *E. tessellaris*. At all events this shows that the line between the Leiophloiæ and its sub-group Tessellatæ must be very cautiously drawn.

Timber dark brown.

E. SPENCERIANA Maiden.

A tree of moderate height, say 50 feet, with a trunk diameter of 2–3 feet. Bark more or less rugged and flaky, particularly near the butt, such flakes being lenticular, thin and dry. This rough bark extends to a variable extent over the trunk and larger branches. Timber dark reddish brown.

E. TESSELLARIS F.v.M.

Bark totally persistent on the lower part of the stem only, thin, dark-coloured, and by longitudinal and transverse fissures broken up into small angular masses; hence the specific name; the rest of the stem and branches ashy grey and smooth, rarely the whole stem so to the base, according to Mueller.

E. Torelliana F.v.M.

A tall tree, resembling *E. tessellaris* somewhat. It has bark black and scaly up to about 10 feet from the ground, thence upwards dark green and glossy. The scaly portion in thin tesseræ.

Timber fissile, pale-coloured, reminding one of that of *E. maculata*.

f. Angophoroideæ :—

E. aspera F.v.M.
E. brachyandra F.v.M.
E. clavigera A. Cunn.

This section connects with the true Angophoras (so-called Apple trees) in hispid foliage, paper-like fruits, and in other respects.

E. aspera F.v.M.

The type described as a small tree, with smooth greyish-white (ashy-white) bark. Again, it has been described as "A dwarf Gum with white smooth bark," yet with the trunk described up to 2 ft. 6 in. in diameter. It has hispid foliage.

E. brachyandra F.v.M.

A scrambling, small tree of 25–30 feet; bark grey, rough, longitudinally fissured, persistent on trunk and limbs.

E. clavigera A. Cunn.

In its typical form (North-west Australia) not more than 40 feet high, but in better conditions in Northern Queensland it may attain a larger size. The former tree has been described as bark somewhat rough and greyish on the trunk, soon peeling off in plates, leaving the under surface white and smooth—a Cabbage Gum. In Queensland it has been given the same name, and the bark described as tessellated for about 10 feet, then white and smooth. It has tessellated bark at the foot of Astrolabe Range, Papua, according to Mr. C. T. White. Colour of timber deep rich brown.

Explanation of Plates (208–211.)

PLATE 208.

E. Sheathiana Maiden.

1*a*. Flowering twig, including mature leaves, buds and flowers; 1*b*, front and back views of anther; 1*c*, different views of fruits which are, however, not perfectly ripe. From a cultivated plant in the King's Park, Perth, Western Australia. (J. Sheath). The type. The tree stated to have grown from seed brought from the "Eastern Goldfields" (of Western Australia).

E. striaticalyx W. V. Fitzgerald.

2*a*. Juvenile leaf; 2*b*, juvenile leaf a little further advanced; 2*c*, mature leaf; 2*d*, twig-bearing fruits and rather a broad, mature leaf. Milly's Soak, Cue, Western Australia, from the clump of trees which produced the type (J.H.M.).

3*a*. Almost juvenile leaf; 3*b*, mature leaf; 3*c*, buds, showing striæ on both calyces and opercula; 3*d*, front and back views of anthers. From a tree in the Botanic Gardens, Sydney, raised from seed brought by Mr. Maiden from Milly's Soak.

PLATE 209.

E. tæniola Baker and Smith.

1*a*. Juvenile foliage, not quite in the youngest stage; 1*b*, a twig showing buds and flowers; 1*c*, front and back views of anthers; 1*d*, fruits. St. Mary's, Tasmania (L. G. Irby). The type.

E. unialata Baker and Smith.

2*a*. Mature leaf; 2*b*, buds; 2*c*, front and back views of anthers. Mount Nelson, near Hobart (L. Rodway).

3*a*, 3*b*. Juvenile leaves of various widths and shapes; 3*c*, fruits. The Domain, Hobart (J.H.M.).

E. Stricklandi Maiden.

4. Two pairs of juvenile leaves. Note how full of oil-glands they are. (C. E. Lane-Poole.)

PLATE 210.

E. Planchoniana F.v.M.

1*a*. Flowering twig; 1*b*, cluster of fruits, small and undeveloped. Laurieton, New South Wales (Forester G. R. Brown).

2. Fruits, Woolgoolga-road, New South Wales, on the Coast Range (E. H. F. Swain).

3*a*. Juvenile leaf (the earliest I have ever seen); 3*b*, fruit, with well-developed ribs and rim. Coff's Harbour, New South Wales (Assistant Forester A. H. Lawrence).

E. marginata, Sm. var. *Staerii* Maiden.

4*a*. Mature leaf; 4*b*, large, thick-rimmed, nearly spherical fruits; 4*c*, fruit in elevation, showing the valves. King's River road, Albany, Western Australia (J. Staer). I have not figured normal *E. marginata*, relying on the "Eucalyptographia" plate, but, as it has been pointed out to me that this work is almost unprocurable, I will endeavour to furnish a figure later.

PLATE 211.

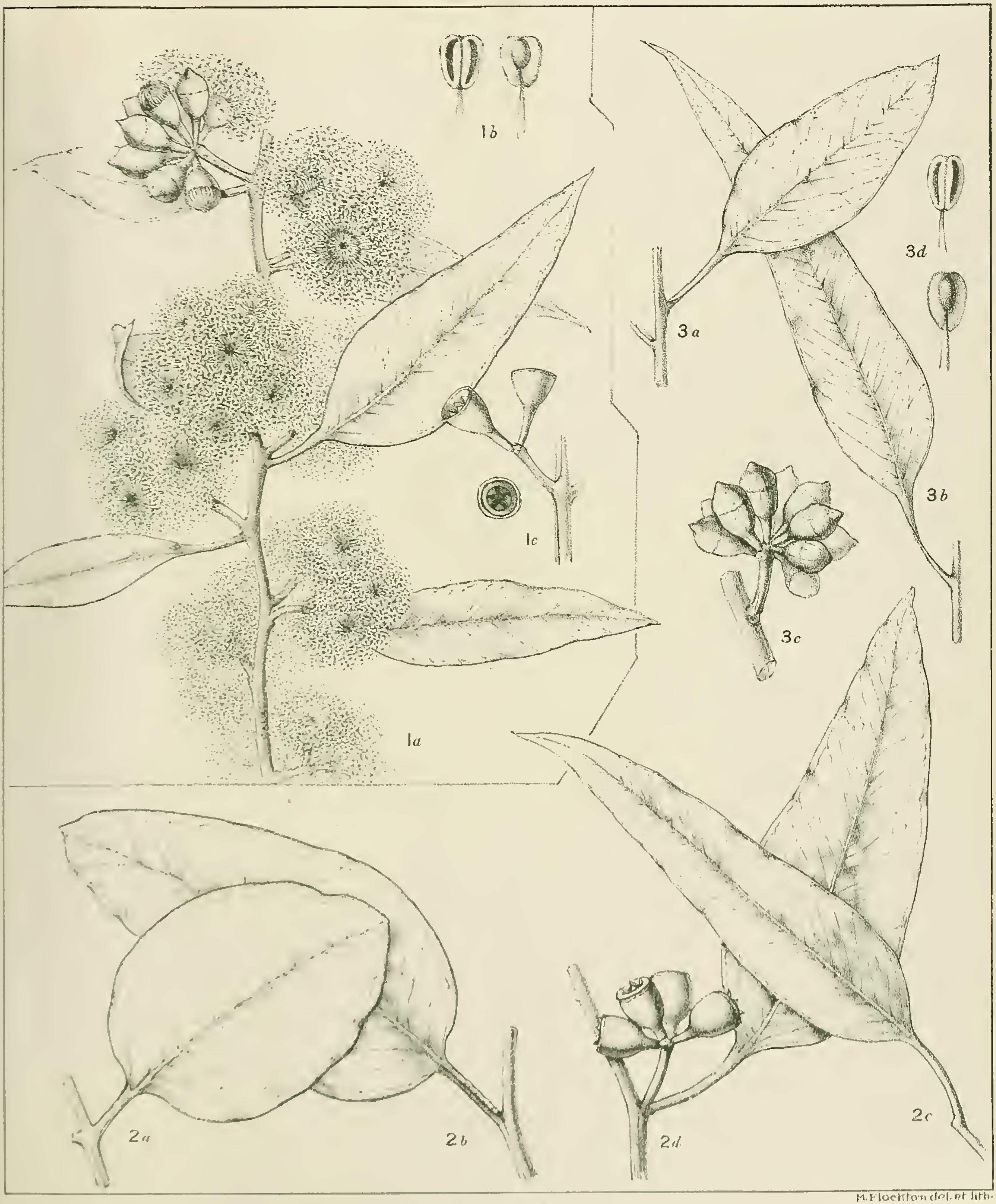
E. Irbyi Baker and Smith.

1*a*, 1*b*. Juvenile leaves; 1*c*, intermediate leaf; 1*d*, mature leaf; 1*e*, twig with mature leaf and buds; 1*f* fruits. Alma Tier, Interlaken, Tasmania (L. G. Irby). The type, received from Mr. R. T. Baker.

2 Smaller fruits, as figured in Baker and Smith's "Research," &c., 2nd Edition, p. 242.

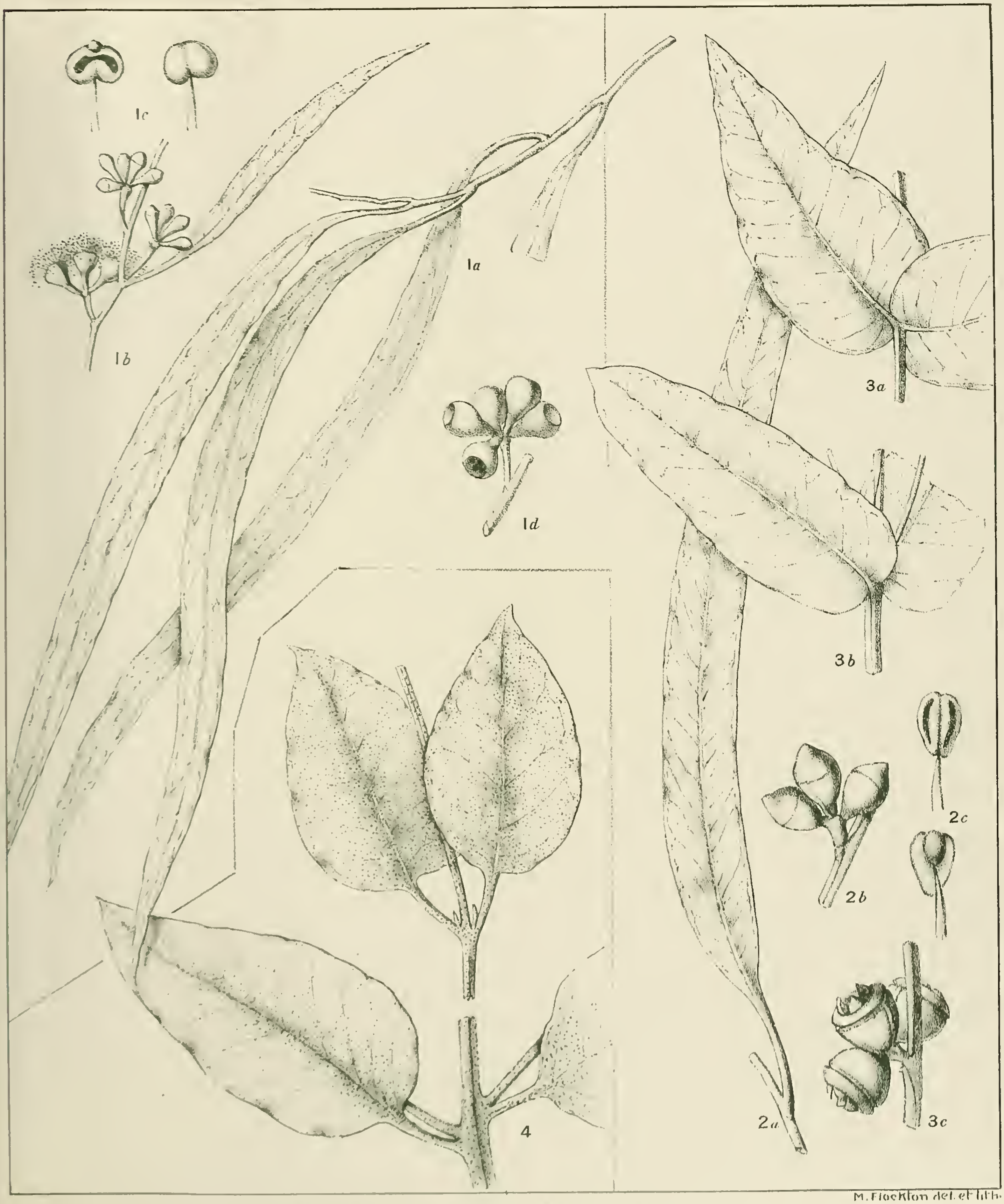
E. Yarraensis Maiden and Cambage, n.sp.

3*a* Twigs, showing mature leaves of various sizes; 3*b*, buds and flowers; 3*c*, front and back views of anther; 3*d*, fruits. Valley of the Yarra, near Healesville, Victoria (R. H. Cambage).



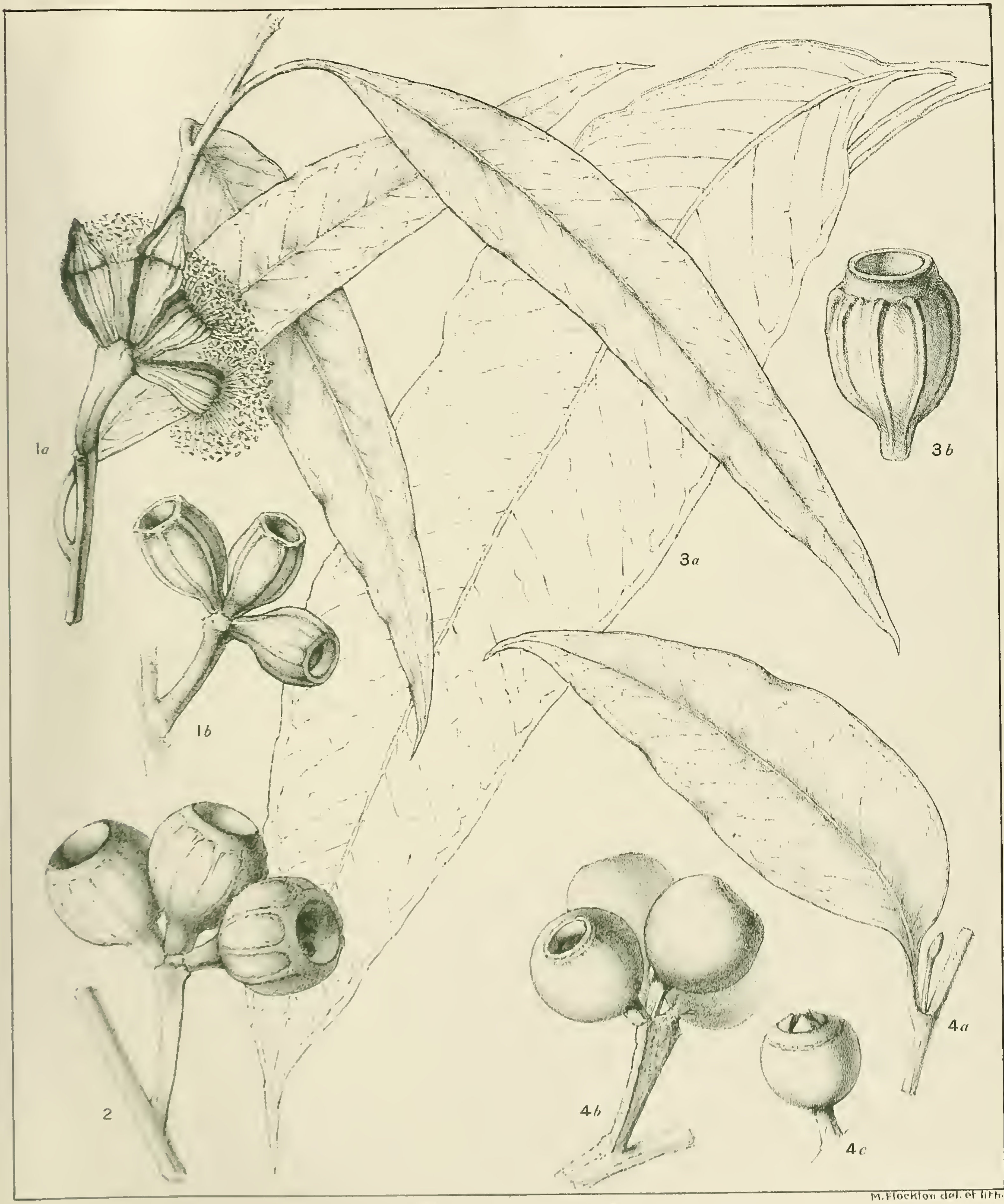
M. Flockton del. et lith.

EUCALYPTUS SHEATHIANA Maiden (*1*).
E. STRIATICALYX W. V. Fitzgerald (*2*, *3*).



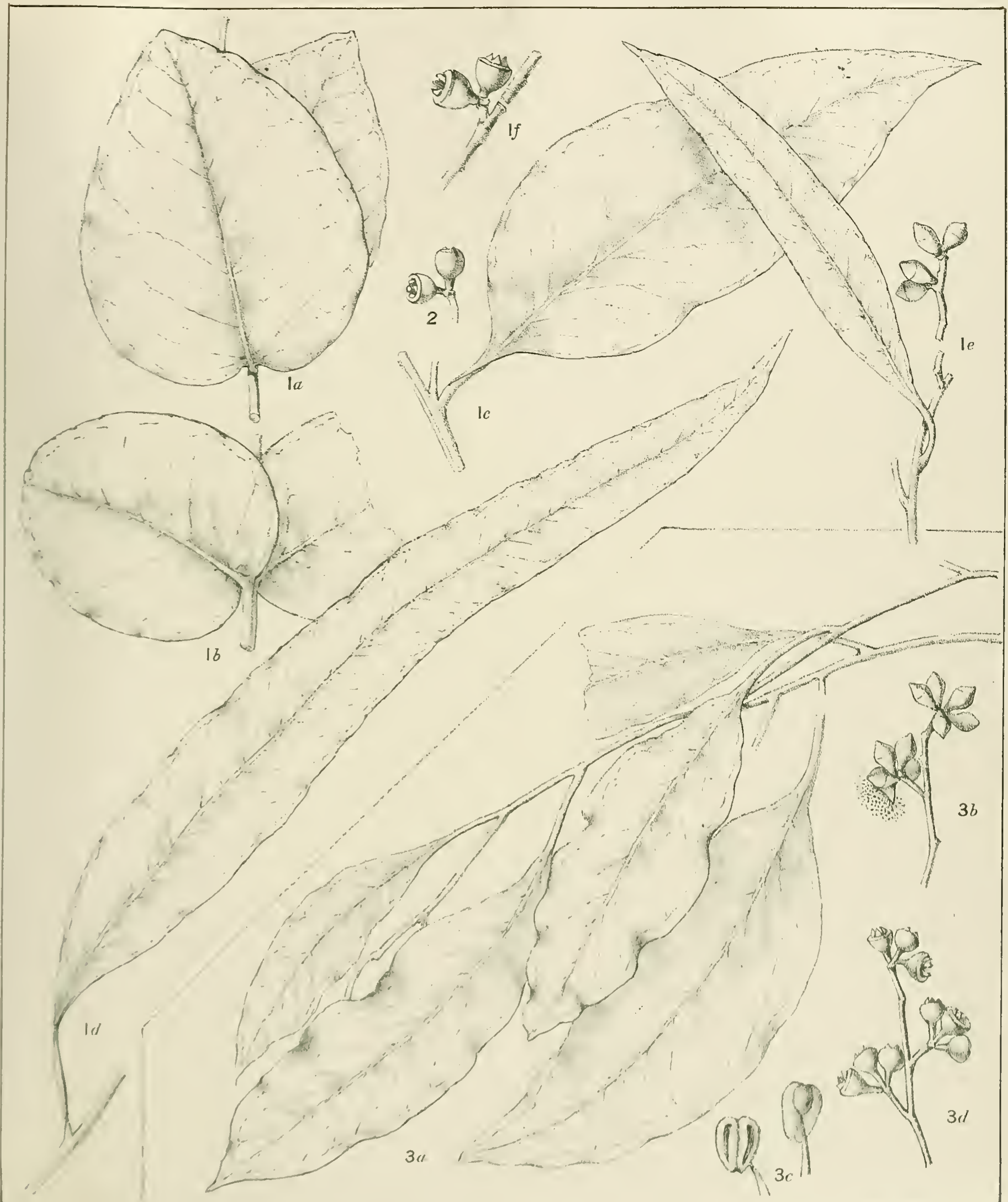
M. Flockton del. et lith.

EUCALYPTUS TEANIOLA Baker and Smith (*1*).
E. UNIALATA Baker and Smith (*2, 3*).
E. STRICKLANDI Maiden (*4*). [See also Plate 71, Part xvi.]



M. Flockton del. et lith.

EUCALYPTUS PLANCHONIANA F.v.M. (*1, 3*).
E. MARGINATA SM., *var*. STAERII MAIDEN (*4*).



M. Flockton del. et lith.

EUCALYPTUS IRBYI Baker and Smith (*1, 2*).
E. YARRAENSIS Maiden and Cambage, n.sp. (*3*).

The following species of Eucalyptus are illustrated in my "Forest Flora of New South Wales"* with larger twigs than is possible in the present work; photographs of the trees are also introduced wherever possible. Details in regard to their economic value, &c., are given at length in that work, which is a popular one. The number of the Part of the Forest Flora is given in brackets :—

acacicides A. Cunn. (xlviii).
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vitrea R. T. Baker (xxiii).

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* Government Printer, Sydney. 4to. Each part contains 4 plates and other illustrations.

NOTE BY GOVERNMENT PRINTER.

War conditions have so largely affected publications that it is no longer possible to continue the issue of "The Forest Flora of New South Wales" at the old rates, and from this date onward, *i.e.*, from and including Part 7, Vol. VII, the price of the individual Parts will be raised to 2s. 6d. each.

For those Parts already published the old sale price will be adhered to, and subscriptions already received will not be disturbed, but the new subscription rate of 2s. 6d. per part, or 25s. for 12 parts, will come into effect as from the 1st July, 1921.

Sydney: William Applegate Gullick, Government Printer—1922

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PART L.

281. *E. Houseana* (W. V. Fitzgerald) Maiden.
282. *E. Jutsoni* Maiden.
283. *E. adjuncta* Maiden.
1. *E. pilularis* Sm., var. *pyriformis* Maiden.
284. *E. pumila* Cambage.
285. *E. rariflora* F. M. Bailey.
286. *E. Mundijongensis* Maiden.

THE BARK.

1. Early references to Eucalyptus barks and early Eucalyptus vernaculars in general.
2. Eucalyptus bark classifications.
3. Mallees, Marlocks, and other small species—
    - (*a*) True Mallees.
    - (*b*) False Mallees.
    - (*c*) Marlocks.

Plates, 204-207 (Issued December, 1921.)